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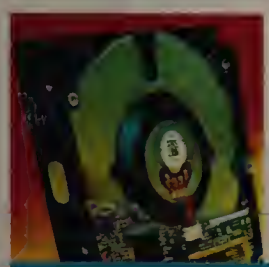

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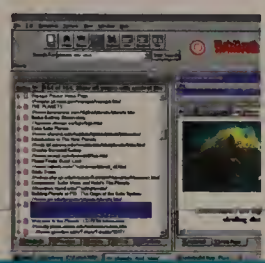

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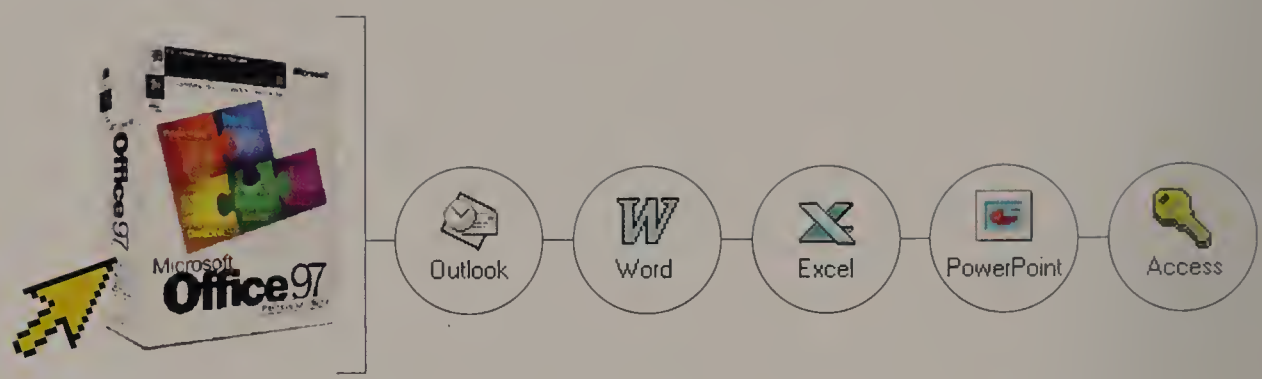

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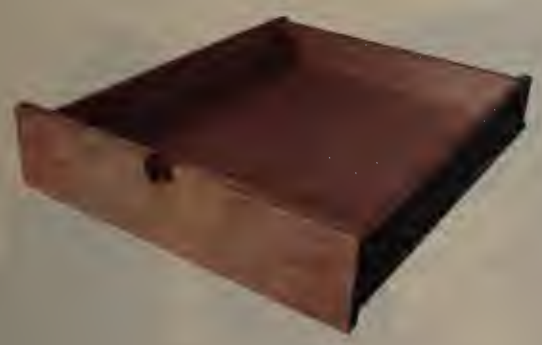

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PC WORLD

JULY

VOLUME 16 ◆ NUMBER 7

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Despite legal skirmishes, Microsoft is ready to release the latest version of the world's most popular operating system. Win 98 sports scads of tiny improvements: a more efficient file system, improved hardware support, better dial-up networking, and a toolbox full of troubleshooting utilities. But does this upgrade make sense when bigger, better NT 5.0 is waiting in the wings?

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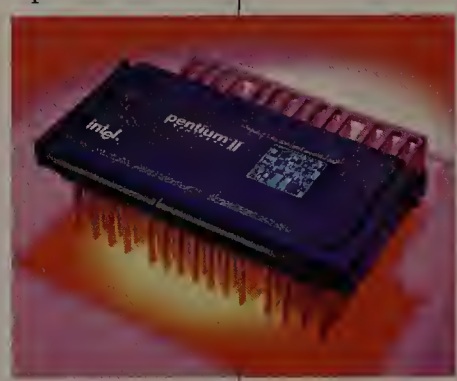

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online Finding a job on the Web turns out to be as tiring as hitting the pavement. Our dogged reporter combs Web sites for career counseling, research on companies, contacts, and free employment listings and leads—with decidedly mixed results.

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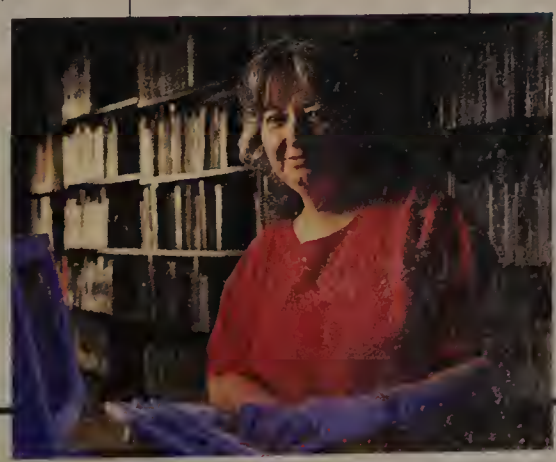

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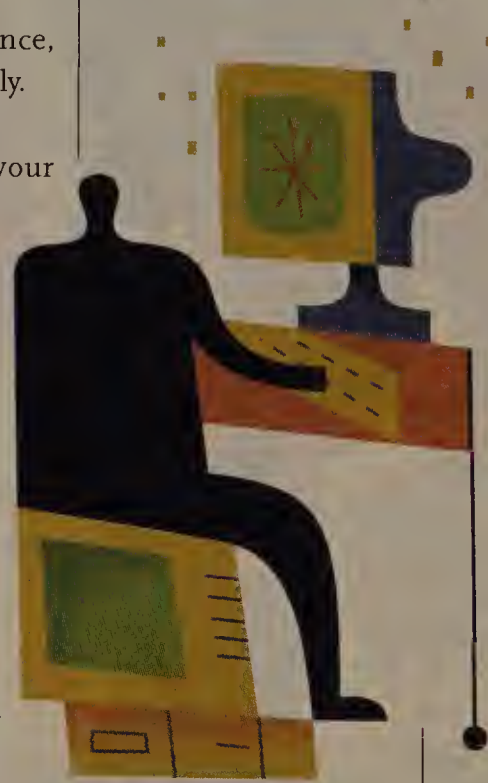

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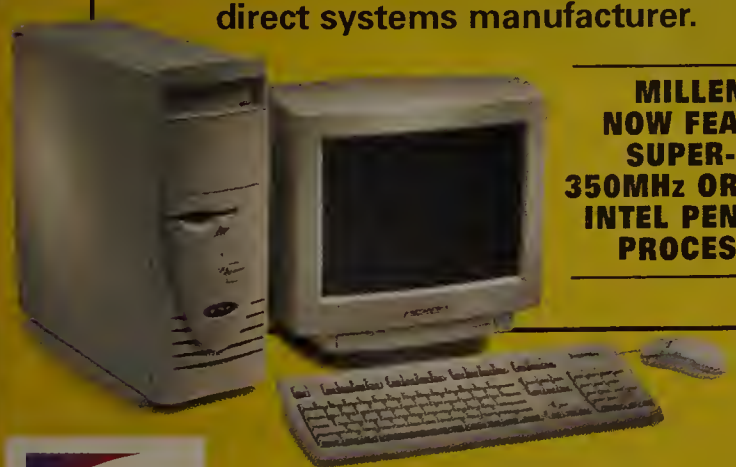

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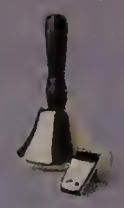

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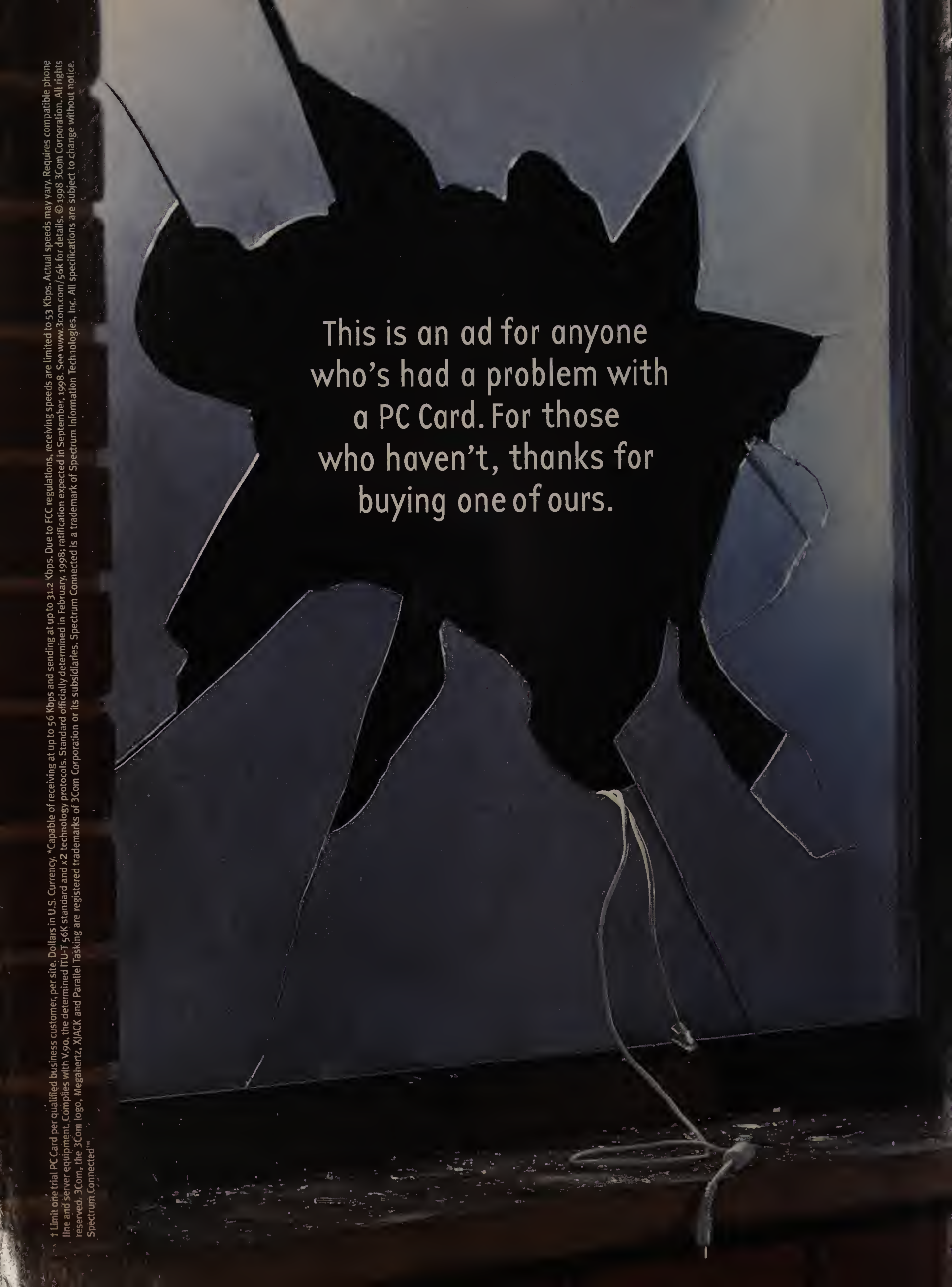

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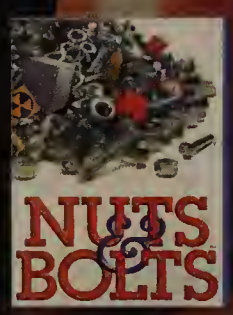

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DOJ to Microsoft: Give Us Choice!

AS THIS ISSUE WENT TO PRESS, the U.S. Department of Justice and 20 states filed broad antitrust suits against Microsoft, charging that the software giant has engaged in anticompetitive business practices in violation of the Sherman Act. At the same time, with its continuing show of arrogance or principle (take your pick), Microsoft is shipping Windows 98 to PC manufacturers and expects that the new version of the operating system will be available in stores on June 25. (For the very latest news, see www.pcworld.com/microsoftnews.)

Even if the courts pull Windows 98 from retailers' shelves, delaying its availability would be no big deal for PC users. The new version fixes bugs, more tightly integrates Internet Explorer 4.0, and adds a few new features. But all told, Windows 98 is not a critical upgrade.

Far more significant are the changes in Microsoft's business practices that could result from the antitrust actions. And though the effects of previous court decisions have been minimal, the impact on PC users this time may be sweeping—if the DOJ and the states prevail.

At issue are the company's exclusionary contracts and licensing agreements with PC makers and others, its predatory pricing, and its practice of "tying" applications to the operating system. Microsoft has used these practices, the suits charge, to maintain its monopoly position in operating systems, to eliminate competitors' products, and to extend its monopoly into new markets, particularly the Internet.

Many observers denounce the antitrust suits as a monumental example of sour grapes on the part of Microsoft's competitors. Others are clamoring for Microsoft to finally get its comeuppance for its hardball—and putatively illegal—tactics. Microsoft itself characterizes the suits as a disservice to consumers, a threat to innovation, and a punishment for its phenomenal success.

Microsoft claims that consumers enjoy more choices today than ever before. That claim is ludicrous.

FEWER CHOICES NOW THAN EVER

IN RESPONDING TO the antitrust suits, Microsoft claims that consumers enjoy more choices today than ever before. That claim is ludicrous. Anyone who has watched the course of personal computing over the last decade is profoundly aware that Microsoft increasingly dominates all aspects of the PC desktop. Today, the only viable choices in desktop operating systems are Microsoft's. Mainstream application software? The lion's share of the market belongs to Microsoft Office. In the relatively young market for browsers, Netscape Navigator is suffering the inevitable slide in market share that everyone predicted when Microsoft started giving its own browser away and requiring PC vendors to include it on all systems with Windows. With Windows 98, as with each previous version of the operating system, consumer choice among competing products continues to dwindle as the OS engulfs a broader and broader range of functions once supplied by other software companies.

If allowed to continue its historical business practices, Microsoft will leverage its existing monopoly to extend well beyond the desktop: through Windows CE to handheld devices that connect to the desktop, and through NT 5.0 and back-office software to networks that run business and enterprises. Add Microsoft's incursion into the set-top box and info appliance market through its own Internet services and operating systems, and the company could well control Net commerce and entertainment, as well.

CHOICE MEANS COMPETITION

UNLIKELY? PURE PARANOIA? Already, Microsoft's ads for Windows CE palmtops push a free upgrade to Windows 98 as an incentive to buy the devices. Internet Explorer 4.0, now inextricably part of Win 98, builds in software for accessing TV and other services over the Net. The next version of Office will add workgroup features now available from other companies' products and will tie closely into NT servers. NT 5.0 will add security features, directory services, and other functions likewise available elsewhere. In Microsoft's world, choice and innovation come from one company's products alone.

It is misguided to interpret the antitrust suits as an attempt by the federal and state governments to get into the business of software design, as Microsoft maintains. To the contrary, these antitrust actions afford a first step toward broadening consumer choice by making substantive changes to Microsoft's business practices. To accomplish this, the courts must refuse to negotiate a meaningless settlement like the 1995 consent decree, even going so far as to alter the company's structure.

Microsoft insists that government intervention will harm businesses and consumers—indeed, will wreck the U.S. economy. An unrestrained Microsoft is a far worse scenario for consumers.

Cathryn Baskin is editor in chief of PC World. ■

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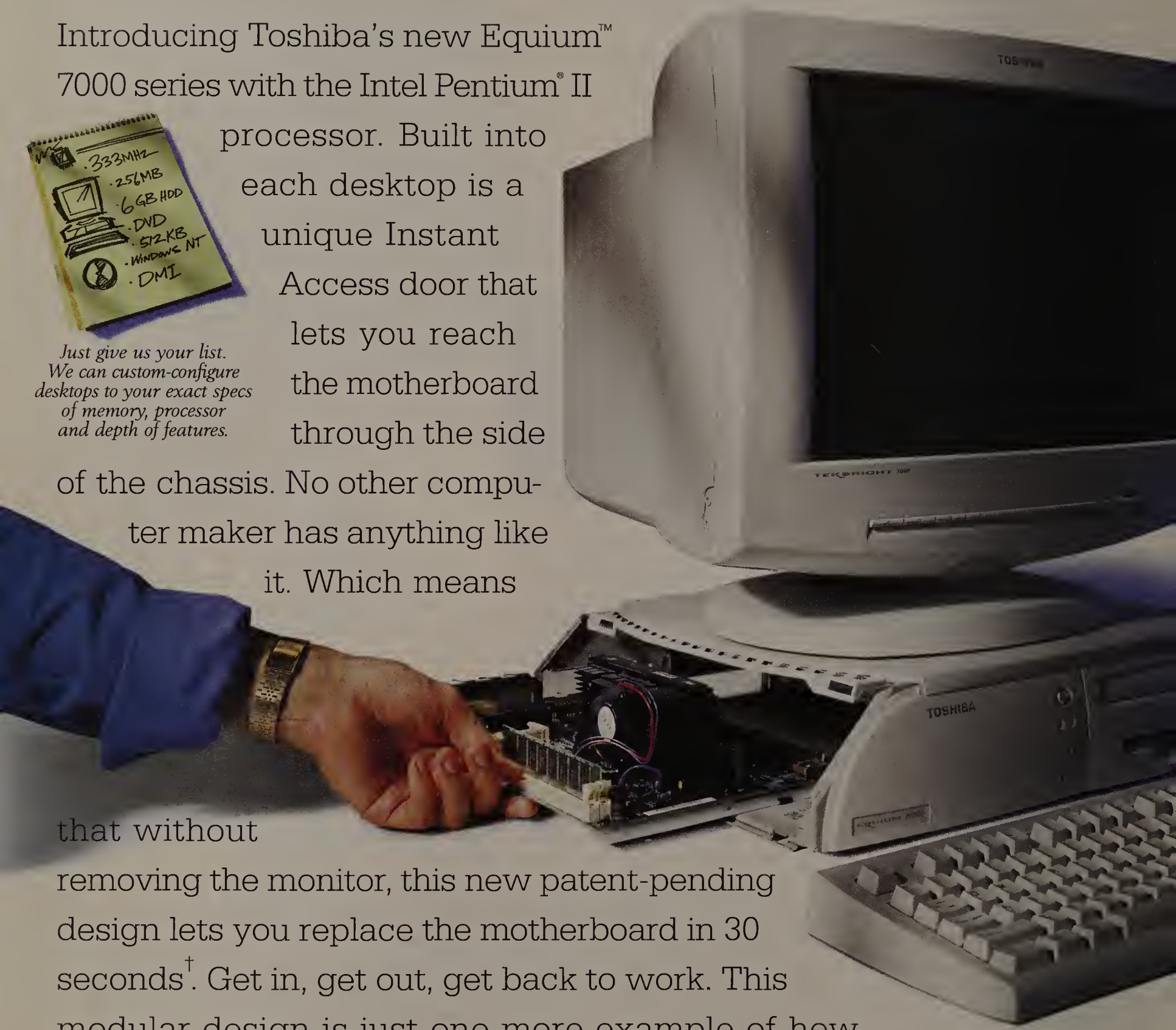

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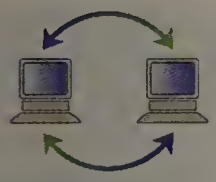

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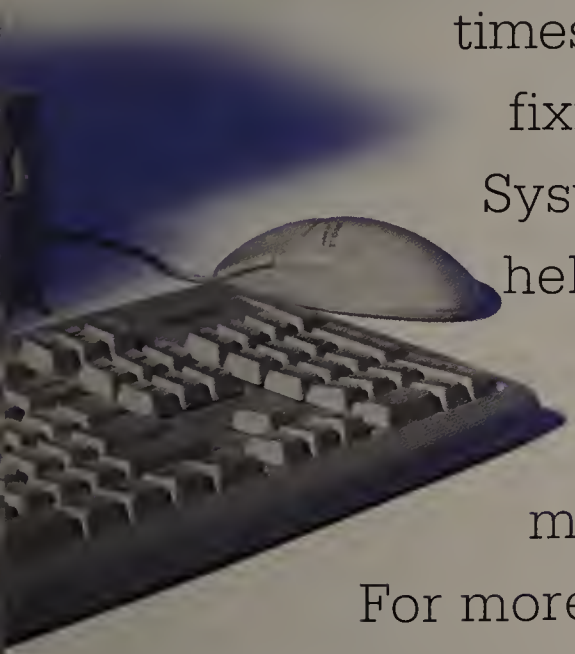

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YOUR TAKE ON: Microsoft vs. Justice • Store-built computers • Internet privacy

WINDOWS–BASH IT OR LOVE IT?

I AM WRITING THIS letter to all the people who complain about Windows 95. I maintain the ten computers running Win 95 at my office, and the only time I see the machines having any problems is when the technology-retarded users start changing areas they know nothing about. Hey, Microsoft bashers, I bet most of you can't even set up your VCR.

John Cosmo
Philadelphia

JUST WHAT SYSTEMS are Linda Homan, Charles Dougherty, and Lyman P. Tryon (*Letters*, May) running to have so little trouble with Win 95? I operate and maintain four different Win 95 PCs, but I still have more than "6-inch hurdles" to clear, and all the machines routinely crash, usually more than once a day.

If it's armchair quarterbacking to complain that an operating system should work as advertised, then I'll cop the plea. But what I *paid* for was an OS to run my applications reliably, and by that metric, Win 95 is a dismal failure.

By the way, what I do on the computers is design parachutes. If my products performed as poorly as Win 95, I'd have been out of business long ago.

Troy Loney, Mount Holly, New Jersey

WINDOWS 98: THEY'RE IN NO HURRY

I WAS ONE OF THOSE who decided to pay the fee to beta-test Microsoft's Windows 98. After all, I had beta-tested Windows 95 and gained a lot of useful knowledge on using the new system months before it went on the market.

Not all went well, unfortunately. Within a day, I started having computer lockups and error messages everywhere I turned. I finally uninstalled the program.

While Phil Pfeiffer [*Letters*, May] didn't see why someone would pay for a beta when the cost couldn't be applied toward the finished product, I got my money's worth. I now know some of the problems ahead and will wait to upgrade.

Alex Blackthorne
Oklahoma City

ACCORDING TO news reports, some high-tech executives have asserted that delaying Windows 98 would have a "direct effect" on the U.S. economy. Is this the same Windows 98 that Microsoft originally called Windows 97? The same Windows 98 that Microsoft has delayed for nearly a year? And am I also to understand that last year—the year in which the promised Windows 9*x* was continually delayed—the economy was terrible? What am I not getting?

Mike Stephens, Internet

SHE WASN'T ALONE

TO JUDY HEIM: After reading your article, "Warning: Don't Tweak Those Plug-In Setup Menus!" [*Internet Tips*, May], I feel as though we have just bonded. Like you, I downloaded and installed a Microsoft plug-in. When I had trouble getting it to work, I, too, went into Communicator's preference settings—and inadvertently created a new application association for the .exe extension. From then on, everything I tried to open wanted to open the new plug-in instead.

It didn't take long to figure out what I'd done, but how to fix it was something else again. I finally called Microsoft. The tech I spoke to had a great sense of humor, understood what I'd done, and within a few minutes (plus $35) solved my problem.

The fix in this case is pretty simple. For you and your readers, for free, here it is:

1. Select *Start•Find•Files or Folders.*
2. Search for shell.inf.
3. Right-click *shell.inf* and click *Install.*
4. Utter sigh of relief, swear you will never tweak again, and get some sleep!

Karen Thompson, Hood River, Oregon

LAST WORD ON PC REPAIRS

YOUR ARTICLE ON the abysmal repair performance of national computer chains ("PC Repair Rip-off!" April) suggests that the primary problem besetting the top chains is incompetence.

As a former PC tech for a county library system, I believe the main problem is, ▶

CROSS FIRE

Watch Out for the Feds, but...

DO WE REALLY want the government to decide what software is good for us ["Microsoft vs. You," *Consumer Watch*, April]? The government didn't give us Windows 95; free market competition did. Otherwise, we might still be stuck with MS-DOS.

The same concerns about monopoly were once aimed at such giants as IBM, General Motors, and Kodak. The marketplace is the great leveler. What's really scary is activists and politicians trying to dictate what consumers can purchase. Soviet-style bureaucracy, anyone?

James Trent Corbett
Chesterfield, Virginia

...Watch Out for Microsoft, Too

I FOUND IT INTERESTING that Microsoft would commission a public survey to determine how consumers feel about government regulation of the software industry. Does Microsoft really think the public might feel sorry for them? As a consumer, I look upon Microsoft exactly as I look upon the government. They are both trying to force me into conforming to a specific standard, and they both subject me to regulations (in a sense) that I have little voice in formulating or approving. I view Microsoft with a watchful, skeptical eye, just as I do the government.

Paul A. LaFiandra, Accord, New York

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PC MAGAZINE Best of 1997 — ViewSonic PT813 *January 1998*

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PC WORLD BEST BUY — ViewSonic PT775 *July 1997*, *January 1998*

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rather, a corporate philosophy at some chains that imposes a demoralizing quota system on employees. Under such quotas, technicians are expected to produce a given dollar figure per hour in repair charges, say $200 per hour. This means performing repairs as rapidly as possible.

Fast technicians can often replace a motherboard much more quickly than they can troubleshoot a problem. The problems are fixed automatically, and if the computer is under warranty, the store will not be charged for the replacement.

William H. Thomas, Seattle

PC SHOPPING: BUY LOCAL?

RESPONSES LIKE Lincoln Spector's to Michael Blessing [*Answer Line*, May] only serve to make an uphill climb for small businesses even steeper. (Spector said that store-built computers "generally produce more headaches.") The attention that local vendors get in national publications like yours always seems to be negative. Can't we get a break? Granted, lots of misinformation is out there. As much homework should be done when buying from a local vendor as from a national one. My company has been in business for 13 years. My technical support department is well paid and boasts a combined total of several decades of PC support experience. Our product line is well respected and stable, and we have less than a 5 percent failure rate. A $20,000 color ad in a monthly publication does not necessarily a good computer make. Feel free to pit one of my machines against the national vendors in your roundups anytime. Should you buy a PC from a local store? If you're a smart, careful buyer—absolutely.

Jerry D. Leclair, Louisville, Colorado

CAVEAT EMPTOR

THANK YOU FOR your May articles "No Easy Fixes" and "You May Lose Your Right to Sue" [*Full Disclosure*]. They complement each other. I run LiveUpdate Pro and Oil Change and could not understand the difference in updates offered by these two programs. Your analysis explained that variance and was an eye-opener. God help us if future software is as bad as these releases, without trial periods and return rights. Keep up the exposé of these practices. We consumers need an advocate.

Eugene Bartell, Rochester, New York

AT&T WORLDNET

YOUR ARTICLE "AOL Rate Hike Ignites Internet Service Price War" [*Top of the News*, May] says that AT&T WorldNet is sticking with a flat $19.95 monthly rate for unlimited access. This is no longer true. According to the service, as of May 1, the Unlimited Plan is being replaced by the Standard Plan, which offers 150 hours of access for $19.95 per month, plus a surcharge of 99 cents for each additional hour. AT&T also has an Hourly Plan (10 hours of access for $9.95 per month); the surcharge for additional hours on this plan is being reduced from $2.50 per hour to 99 cents.

Christopher Beggs
North Riverside, Illinois

Editor's response: Thanks for the information. AT&T WorldNet announced the pricing changes several days after our article went to press. –Dan Miller

CORRECTIONS AND CLARIFICATIONS

IN MAY'S *New Products*, we reviewed a beta of Jasc Software's Paint Shop Pro 5, stating that users couldn't create their own Picture Tubes and were limited to premade choices. Picture Tube creation has since been added to the release version of Paint Shop Pro 5.

In "No-Hassle Hookups" (May), a footnote in the monitors chart on page 182 identifies the wrong product as "Our pick"; our actual top choice was the Philips Brilliance 107.

June's *Top 10 Personal Printers* gave the wrong overall ratings for two monochrome printers. For both the NEC SuperScript 860 and NEC SuperScript 660plus, the rating should be 80. The ranking order is correct.

After the June issue of *PC World* went to press, the URL for Net-Timer Pro (*Internet Tips*, page 302) was reassigned to a Web page containing inappropriate content. GeoCities, the hosting service for the Net-Timer Pro site, has since removed the offending page. We apologize for all problems and any inconvenience this may have caused. You can download Net-Timer Pro from PC World Online at www.pcworld.com/july98/timer.

PC World regrets the errors.

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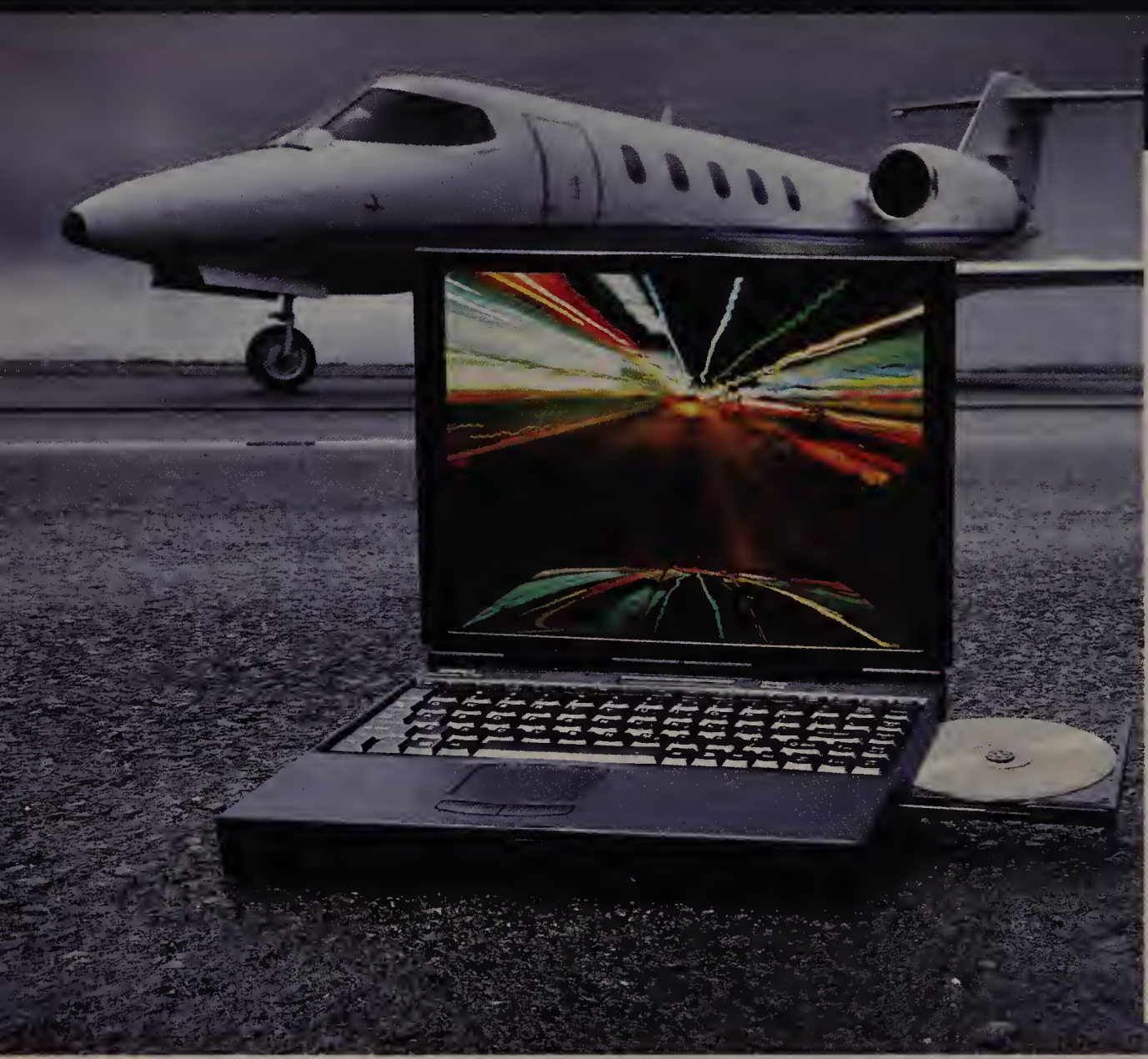

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TROUBLESHOOTING CORRECTION

"PC REPAIR RIP-OFF!" [April] has a serious error in the "Modem on Blink" chart that, if followed, would lead the troubleshooter to do the opposite of what's necessary to get the internal modem to function, creating a resource conflict between the motherboard I/O and the modem.

A change must be made on the "No" option for the step reading "Power down PC and open case. Verify modem is securely in slot and IRQ and COM port jumpers are properly set. Does modem work?"

You should proceed to a new step, which would read "Confirm that the serial port in BIOS, corresponding to the COM port setting on the modem itself, is disabled; then remove and reinstall drivers. Does modem work?" Options would be "No (Contact vendor)" or "Yes (End of story)."

Rick Pearson, Fallbrook, California

Editor's response: You are correct. In a non-Plug-and-Play system with a non-Plug-and-Play modem, Windows 95 can't see the conflict (between the motherboard's COM port and the modem card's COM port) that your new step would find. Thanks for catching our error. **–Shane Rau**

AUTOMATIC UPDATES? NO WAY

SCOTT SPANBAUER SAYS in "No Easy Fixes" [May] that automatic update services may be "a better way" to get bug fixes, drivers, and program updates. To me, the idea of someone changing files on my computer behind my back is absolute anathema.

I use my machine for beta testing, so I must periodically wipe out and reload my hard disk. But how can I do that if I have no control over the latest configuration? Traditional backups represent an imperfect solution, since I don't know which portion of what backup represents the system I want to restore. So I keep both the original distribution media of my software and all patches that have been released. Reformatting and reloading my disk then becomes a surprisingly manageable way of returning to my previous working configuration (omitting, of course, the last piece of software that crashed the system).

For those who want automatic updates and don't have my reservations, the solution is to provide the option of either a live update or a patch file. But few software houses offer this choice.

Erwin Schmerling, Kensington, Maryland

Author's response: Actually, I basically said, "Don't buy these programs–they don't work." Your approach sounds effective but time consuming. Until developers deliver software that works reliably, automatic update utilities may be our best hope. **–Scott Spanbauer**

PRIVACY FOR SALE

AS A TEN-YEAR veteran of the investigative industry, I found the article "Flawed Privacy Agreement Lets It All Hang Out" [*Top of the News*, April] of interest.

Our privacy has been for sale for years. But only recently has it become available to so many for so little—due in part to the Internet. When I started my agency years ago, my work had to be done the "old-fashioned way," and it still does—it's just a bit easier and faster. I've found that only a fraction of my information from computerized sources is good enough to use.

It is the individual who must take the first step to protect individual privacy! We are too free in giving out information—usually in response to surveys, warranty registrations, contests, and so on. I do not believe regulation will protect us.

Dean A. Beers, Ft. Collins, Colorado

HOW SCANNER CHANGED HANDS

IN YOUR ROUNDUP of Universal Serial Bus devices ["No-Hassle Hookups," May], you reviewed Storm Technology's PageScan USB scanner. The review was good and made me want to check out this product, but upon looking for it I discovered that it isn't made by Storm Technology but by Logitech. (If you look closely, you can even see the Logitech logo on the scanner in the picture that appears on page 178.)

Steve Vogt, Geneva, New York

Editor's response: No error. Logitech sold its scanner business to Storm Technology in the midst of our evaluation of the PageScan, and a scanner with the Storm logo was not available in time for photographing. We apologize for the confusion. **–Michael Desmond**

PC World *welcomes your responses, ideas, and other letters to the editor.* *See page 14 for contact information.*

COMING UP
IN AUGUST

FINE-TUNING WINDOWS 98

Did you buy in at the beta stage? Just decide to upgrade? Still in a quandary? From improved troubleshooting to FAT32, we show you how to take full advantage of Microsoft's latest.

HELLO, COMPUTER!

The hype: You can now put away your mouse and speak directly to your PC. We try continuous-speech voice-recognition packages to find out how accurate and productive they really are.

GRAPHICS BOARDS: AGP OR PCI?

Last time we checked, AGP graphics boards were full of problems. This time, we pit the latest wave of AGP cards against ten PCI graphics boards to see which type is best for your PC.

VIDEOCONFERENCING

Videoconferencing is touted as a great business tool, but have products improved on the herky-jerky video? Connecting over phone lines and LANs, we test six kits in search of a clear picture.

ALSO NEXT MONTH

▶**Top 100:** The top power desktops, budget desktops, notebooks, and home PCs, plus printers, monitors, graphics boards, and modems.

▶**Web Tips for Small Businesses:** From dealing with government agencies to sending overnight packages, the Web can make the details of running your small business a snap.

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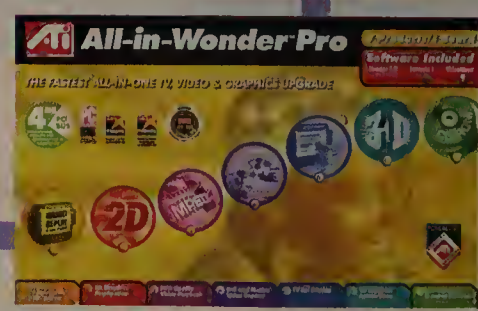

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Circle 5 on reader service card

PC Theft: It Pays to Be Prepared

PC burglaries are on the rise. Here's how to protect yourself from losses and insurance hassles.

SUMMER MIGHT BE the best time for vacations, but it's also high season for crime. According to the Department of Justice, more burglaries occur in July and August than at any other time. And in any home or business hit, computer equipment ranks among thieves' favorite targets.

Before you embark on this year's getaway, try this little exercise: Add up what it would cost to replace all your hardware and software and then ask yourself, "What have I done to protect my computer investment?" If your answer leaves you feeling nervous, it's time to get your computer house in order.

One of the first items on your to-do list should be a detailed inventory of your hardware and software. Check your records, noting the make, model, serial number, and purchase price of each piece of hardware. Then make a list of your software collection (at least the more expensive packages). Store the list—along with supporting receipts—in a secure location such as a safe-deposit box. (Your meticulous record keeping will be for naught if your only copy is stored on the hard drive of a stolen computer.)

This record will serve two purposes: It will help you determine whether your existing insurance coverage is adequate (more on this later); and if your equipment is stolen, it will let you provide crucial information to the police and your insurance company. Insurance companies treat this information (along with receipts) as proof of ownership, and the police use it to track down stolen goods. Too often, we neglect to keep a record of this vital data.

TRACKING YOUR PC

WELL-MAINTAINED records greatly increase your odds of recovering a stolen computer. The National Computer Exchange (www.nacomex.com) runs a Stolen Computer Registry, which law enforcement officials throughout the country use to report and track stolen equipment by serial number. Individual consumers can access the database to enter information about their stolen goods or to confirm that used equipment they're considering purchasing isn't hot.

Law enforcement officials recommend labeling all home electronics with your name and address. Attaching permanent identification tags or etching personal information into the back of your valuables makes it harder for a thief to sell them. Marking your hardware also increases the odds of getting your property back if the police recover it. Many local police departments' crime prevention units will lend etching tools to area residents.

Another identification solution is offered by the National Computer Registry (www.pcid.com). For a one-time fee of $69.95, it will enter data on up to 10 different pieces of computer equipment into its database and send you ID tags for each hardware item. When police recover the items, they will match the information on the tag against the registry's database, reuniting you and your PC.

Once you've inventoried and labeled your belongings, it's time to evaluate whether ▶

ILLUSTRATION: JANET WOOLEY

you have enough homeowner's or renter's insurance coverage. If your home setup consists of a single computer and printer valued at $5000 or less and used almost exclusively for personal purposes, your existing policy is probably fine. But don't just assume this is so; check with your insurance agent to verify your coverage. The Insurance Information Institute (www.iii.org), a nonprofit trade association based in New York, recommends buying a policy that covers the replacement cost of computer equipment. Many policies reimburse you only for the actual cash value—the depreciated cost of the items. The III reports that a typical replacement-value policy costs only 10 percent more than an actual-value policy.

If the replacement value of your computer setup exceeds $5000, or if you regularly use your computer for work, a standard homeowner's policy won't cover all your equipment. Specifically, if you operate a business out of your home or you regularly telecommute, your insurance company may deem your computer "business equipment," which isn't covered under a homeowner's or renter's policy. Either way, most insurance policies don't cover software.

Consumers who need extra coverage have two options: Get a floater on their existing homeowner's policy to cover all their hardware and software, or purchase a policy from a company that specializes in computer insurance.

THE PC FLOAT

ACCORDING TO Jayna Neagle, manager of new media for the III, policy floaters typically cost in the neighborhood of $1.50 for every $100 worth of equipment. (So hardware and software with a replacement value of $7500 would cost roughly $112.50 a year to insure.) In return for this additional cost, most floaters cover things a typical homeowner's policy won't, such as damage from power surges or viruses.

Computer insurance polices like those offered by Safeware (www.safeware-ins.com) or The Computer Insurance Agency (www.computer-ins.com) typically provide all the protection of a floater, including small (or no) deductibles, replacement value coverage, and protection against losses due to viruses, power surges, theft, fire, or vandalism.

Although rates for homeowner's policies vary depending on where you live and what level of coverage you desire, computer insurance rates are fairly consistent. Both Safeware and TCIA base their coverage costs exclusively on the value of the insured system (PC and peripherals)—not on the owner's location. For equipment valued at between $5001 and $8000, Safeware charges $89 per year. TCIA's rates are higher: $150 for equipment valued at between $5001 and $6000.

Talk to your insurance agent and check out the plans offered by computer insurance companies to determine which type of policy would work best for you. Besides the individual policies' costs, factors to consider include the comfort of dealing with a trusted insurance broker and the simplicity of buying a policy from a company that specializes in computer coverage.

STOP, THIEF!

IF YOU'RE LOOKING for a little added security, you'll find a handful of hardware devices for thwarting would-be thieves. Most of these products fall into one of two general categories: cabling systems—such as Kablit from Secure-It (www.secure-it.com) or the Flexguard Security System (www.flexguard.com)—that physically chain and lock your computer to your desk; and motion detection alarms like BluVenom (www.bluvenom.com) that mount on the parallel port or floppy drive.

If all your crime prevention efforts fail to prevent a burglary, software-based tracing systems such as The CyberAngel (www.sentryinc.com) and CompuTrace Theft Recovery System (www.computrace.com) use your stolen computer's modem to pinpoint the thief. For example, when you report the PC stolen, CompuTrace waits for a phone line to be connected to the computer and then silently dials out, informing a monitoring center of the call's origin and the PC's CompuTrace ID. CompuTrace then informs you by phone or e-mail, so you can summon the police and arrange to reclaim your property.

The III's Neagle says the best kind of theft deterrent "is something visible," noting that the mere glimpse of an alarm or cabling system might be all it takes to keep a burglar from even trying to steal your equipment.

PC SECURITY CHECKLIST

- **Maintain detailed records.** Do this for all your hardware and software, and include model and serial numbers. Update the list periodically and keep a printed copy in your safe-deposit box (or other secure location).
- **Back up regularly.** You can replace stolen hardware and software. You can't replace valuable business and personal files. Store backups off-site.
- **Review your insurance coverage.** If the value of your computer equipment investment totals more than $5000 (the typical limit imposed on a homeowner's policy) or if you regularly use your home computer for work, consider purchasing a floater to your homeowner's policy or a separate policy to cover your hardware and software.
- **Be inconspicuous.** If at all possible, avoid placing computer equipment near windows. Store notebooks, digital cameras, and other smaller items out of sight.
- **Make the thief's job difficult.** For added security, buy a cabling or alarm system to make it that much harder for a burglar to hit and run successfully.

BEFORE YOU PACK YOUR BAGS

IF YOU'RE LIKE ME, important but postponable matters like insurance somehow always seem to wind up way down at the bottom of your to-do list—somewhere between organizing your files and recording financial information. But make no mistake: Protecting your valuable computer hardware and software shouldn't be an afterthought.

Do you have a valuable PC security tip? Send us all the details by e-mailing us at consumerwatch@pcworld.com. PC World *Contributing Editor Roberta Furger is the author of* Does Jane Compute? Preserving Our Daughters' Place in the Cyber Revolution *(Warner Books, 1998).* ■

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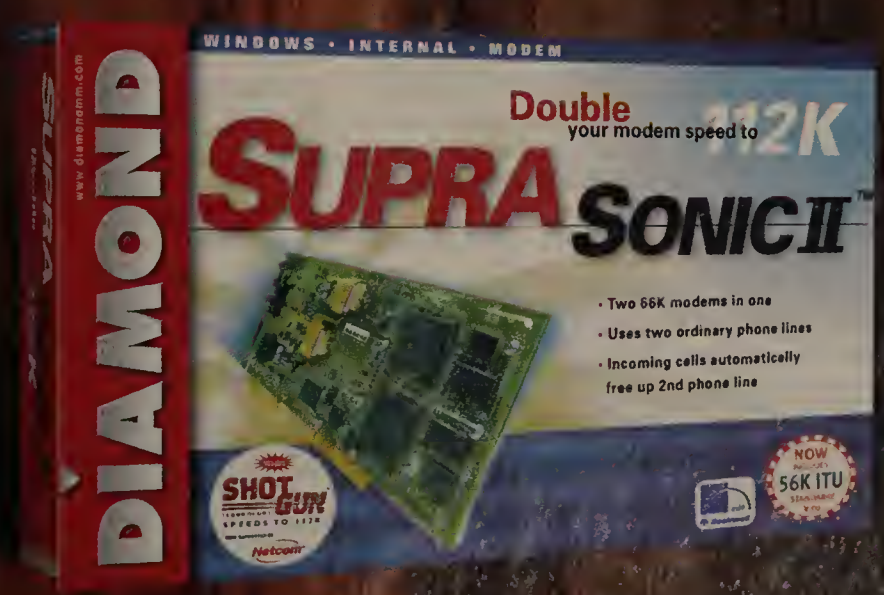

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   - b) a cold toilet seat
   - c) my home
2. **My spouse would be happier if I were:**
   - a) rich
   - b) better looking
   - c) a long haul trucker so I could spend more time at home
3. **My server maintenance routine often involves:**
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   - b) diagnostics
   - c) offerings to the gods.

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Circle 86 on reader service card

WE HELP WITH: Dell's problems ◆ Vendors who go belly-up ◆ Palm Pilot rip-offs

Is Dell Living Up to Its Reputation?

STANLEY FORD of Boscawen, New Hampshire, sums up what a lot of readers have told me lately about Dell: "*PC World* has been rating Dell very highly. I have problems with my Dell PC, and I've gotten very little satisfaction from the company. I, for one, think its service is overrated."

In recent months *PCW Advocate* has received more letters than usual from Dell owners with serious problems—ranging from slow PC deliveries to difficulty reaching tech support to repair snafus.

Dell spokesperson Bill Robbins says that many of the complaints were due to heavy sales over the holidays and early in the year. Still, he had Dell's service and support staff examine the letters I forwarded, to identify and address any procedural problems.

As a result, Robbins says, Dell has created sales rep training programs, expanded its support e-mail group, hired more phone reps to reduce callers' hold time to 5 minutes or less, and installed a production-time calculator to help sales reps better estimate PC delivery dates. When we called Dell's tech support recently, our hold times averaged 3 minutes. Dell is also responding to the complaints I forwarded.

In recent weeks, complaints to *PCW Advocate* about Dell have declined drastically. But keep your feedback coming.

Company Kaput?

WHAT DO YOU do when you pay for a product but the company goes out of business before you receive it? I've been asked this question a lot recently, especially in light of the demise of PC maker DirectWave. Unfortunately, the answer isn't always pretty.

If the company has filed for Chapter 11 bankruptcy, don't worry. The business should operate as usual—it's just reorganizing. If the company files under Chapter 7, worry. The enterprise is going out of business and planning to liquidate its assets to pay off certain creditors—but individuals are usually the last to get reimbursed. Contact the Chapter 7 trustee for the case, but don't get your hopes up. You can't sue a company that has filed under Chapter 7 or Chapter 11. If the company disappears without filing for bankruptcy, you can sue. Try small-claims court; in most states, you can recover $2000 or more. But you'll have to find the principals first.

If you paid for goods you never received, your best bet is to contact your credit card company. (You *did* pay with a credit card, right?) Some credit providers impose a time limit on such help, so you need to move fast. If you think a company is perpetrating a fraud, notify the appropriate authorities. They are listed (along with complaint forms you can fill out online) at www.fraud.org.

Your best strategy to employ in all cases is caution: Check out a company with the Better Business Bureau (www.bbb.com) before you buy, and pay with a credit card that offers the best possible protection.

Palm Pilot Pickpocket

WHEN JOEL SCHWARZ of New York City discovered that his trusty Palm Pilot had been stolen from his jacket, he figured he could buy a replacement unit from 3Com and download all his data from the backup he kept on his PC. That's when he discovered a stubborn rule at 3Com. If he'd broken his Palm Pilot, 3Com would have sold him a replacement for around $100. But since it had been stolen, Schwarz's only recourse was to buy a complete new $199 package, including duplicates of the docking station and the software he already owned.

A spokesperson for Palm Computing confirmed this was the case and said that the company is considering a new service plan that would protect its customers against theft. At press time, no further details were available.

THE FINE PRINT

GOT PRINTER PROBLEMS? KNOW YOUR SERVICE OPTIONS

THE FINE PRINT in this Canon printer warranty might give you pause: If you buy a new printer that turns out to be broken, you get a refurbished (read: *used*) printer as a replacement. This policy—common to many printer manufacturers—isn't such a bad deal. Here's why: When you send your printer in for warranty repair, you usually get back the same printer—all fixed up (you hope). But if you aren't willing to wait for repairs, you can ask the manufacturer to overnight you a refurbished printer. Canon claims that refurbished units undergo more rigorous quality assurance tests than brand-new printers. So this gotcha is a deal you might want to take advantage of.

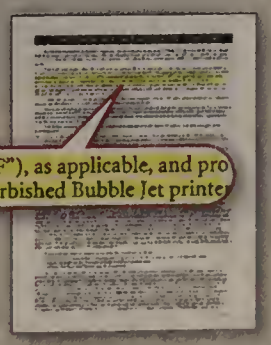
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ILLUSTRATION: JAMES YANG

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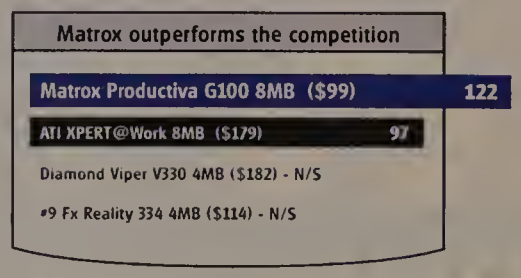

Since its new MGA-G100 graphics chip is optimized for Windows, Ellen gets the fastest 2D acceleration in the industry, and support for today's 3D and video-based business applications. Productiva G100's 8MB of memory secures unparalleled display quality. In fact, even at 1600 x 1200 resolution, viewing true color documents or multiple windows is a breeze. And with hassle-free unified driver support for all of today and tomorrow's major operating systems, she's got reliable performance across the board.

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*Estimated Street Prices accurate at time of printing. All tests conducted by Matrox Graphics Inc. using a Dell Pentium II 300Mhz with 64MB of RAM and 512K cache. Matrox Productiva AGP was tested with 8MB of memory using driver revision 3.82. ATI XpertI@Work AGP was tested with 8MB of memory using driver revision 4.10.01.2278. Diamond Viper V330 and Number Nine 9Fx Reality 334 were tested with 4MB of memory using driver revisions 4.10.01.0022 and 4.10.1102 respectively. WinBench 98 Business tests conducted at 1280x1024@24bit at 75Hz refresh using small fonts under Windows 95 OSR2.

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POWER PQ QUEST

To Overclock or Not to Overclock?

PROBLEM *You want to speed up your PC for free but don't know if forcing it to go faster is a good idea.*

SOLUTION *Learn what you'll be doing to your PC, and if you decide to go for it, do it right.*

PHOTOGRAPH: BOB HOLMGREN

LAST MARCH, KARL ZIMMERMAN bought a new PC—but it wasn't the PC he really wanted. Like many of us, Zimmerman was on a budget and needed to compromise.

"I had to make some trade-offs in putting together my system," says Zimmerman, a software engineer at a Silicon Valley medical company. "One trade-off was to select a lesser CPU than I wanted and apply the money saved to upgrading other components."

In the end, Zimmerman bought a Pentium II-266 system with 64MB of RAM. That's a pretty fast chunk of hardware, but Zimmerman wanted more. He'd learned about overclocking the way many people do—from an Internet newsgroup. Simply put, *overclocking* means changing some of your system's settings to make it run faster than it was designed to go. Following an online trail, Zimmerman read about his PC's motherboard and decided he'd try to overclock it. The result? "My system is now ticking along at 300 MHz," he reports.

Sounds great: You pay for one PC and end up with something faster. But Zimmerman's success doesn't mean overclocking is as natural as slipping your car into high gear. Check the newsgroup comp.sys.ibm.pc.hardware.chips, and you'll see as many "my PC is screwed up" postings as you will "my PC is reborn." Because overclocking sounds so easy, people don't bother to learn about the risks. And there are plenty, from overheating to voiding your warranty.

OVERCLOCKING 101

THIS MINICOURSE is like Sex Education 101. We're not saying do not overclock your PC, though we strongly advise you not to. But someday someone is going to tell you how wonderful overclocking is, so you need to protect yourself and avoid taking unnecessary risks.

The speed of your PC is determined by the speed of the system bus and by something called a CPU multiplier. Change one or both and you have a faster PC. Zimmerman's original PC had a multiplier of 4 and a system bus speed of 66 MHz. He changed a jumper on his motherboard to accelerate the bus to 75 MHz, which boosted the system to 300 MHz (75 MHz multiplied by 4).

Simple enough? Not really. After he first jumped his system bus, Zimmerman says, his PC still wasn't functioning at top speed. He posted a message at a newsgroup and learned he needed to adjust his PC's CMOS. Finally, the system ran just right.

But just because overclocking worked for him doesn't mean it will work for you. For one thing, not all motherboards support speeds over 66 MHz. And some component manufacturers are taking steps to discourage overclocking. Intel has started to design its CPU multipliers so they can't be changed.

Even having a system that *can* be overclocked is no guarantee of success. Charles Kozierok, MIS director at a Massachusetts manufacturing firm and Webmaster for The PC Guide (www.pcguide.com), cautions that what seems like ▶

a good arrangement initially can turn disastrous down the road. On The PC Guide site, Kozierok warns would-be overclockers that "whether you succeed or not [in overclocking] is as much a matter of luck as it is of skill."

For one thing, a PC running faster than intended may overheat and crash. Other dangers include shortening your CPU's life span and damaging other system components. What you end up with is general instability. Once you've overclocked, if a software program starts locking up, you can't be sure of the cause.

Kozierok says that inexperienced PC users should refrain from overclocking unless they have a spare PC they'd like to tinker with. Ultimately, the benefits may not be worth the trouble. According to our PC WorldBench tests, the average Pentium II-300 is only about 6 percent faster than the average Pentium II-266, an increase you're unlikely to notice in the programs you use most.

WASTED CYCLES

STILL, SOME people say overclocking is a good, natural thing. In fact, it has been around since the old days when people were replacing 6-MHz clock crystals with 8-MHz crystals in their 286-based PCs.

Scott Wainner, Webmaster of System Optimization (www.sysopt.com) is an overclocking advocate. While he advises people to be careful, he says that anyone who does CPU-intensive tasks is wasting CPU cycles by abstaining.

If you decide you want to overclock your PC, we offer the following guidelines:

1. Get the whole picture. Hit the Net and read all you can about overclocking.

2. Read your manuals. Make sure your PC can run at faster speeds. You'll probably have to call your motherboard manufacturer to find out for sure.

3. Cool it. Buy a bigger heat sink and even a CPU fan. Overheating is probably the biggest hazard, so be prepared.

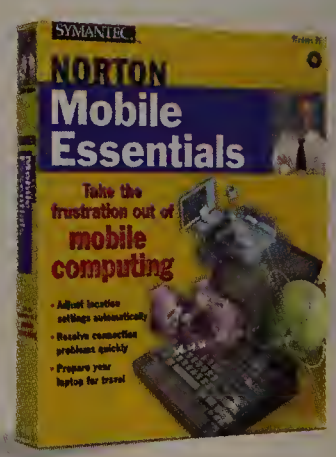
4. Back up your hard drive. You'd do this before performing a normal upgrade, so you should definitely back up before doing something your PC never expected.

5. Tear up your warranties. You might as well save some shelf space, because your warranties will be void if you start fooling around with the system's bus speed.

6. Be realistic. If you must try overclocking, don't go too fast. Start with small speed boosts, like 266 MHz to 300 MHz. Remember, pushing a PC too far is a recipe for disaster.

7. Don't be afraid to chicken out. If you overclock your system and something isn't right (you get a boot error, the system locks up, programs crash), change it back at once. But be forewarned: Sometimes you can't undo an overclocking mishap.

Having trouble resolving a PC-related hardware or software problem? We'd like to hear about it. See page 14 for contact information. Brad Grimes is a senior associate editor for PC World. ■



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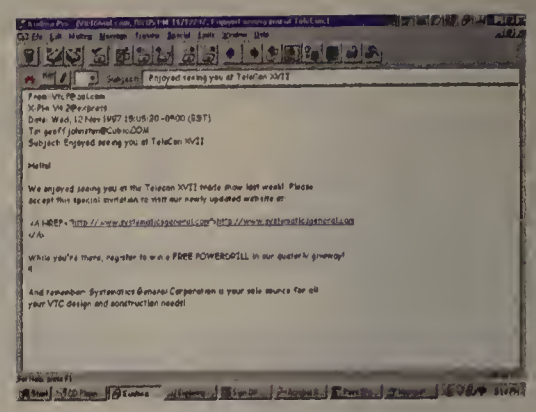

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IE 4.0 Service Pack 1 ◆ Office 97 Service Release 2 ◆ DUN 1.3 ◆ DirectX 5.2

All Microsoft, All the Time

NORMALLY, BUGS AND FIXES covers product updates from any and all companies, with frequent appearances by Microsoft. But this month, The Vendor takes center stage. With Windows 98 about to arrive, and the next version of Office—and Gates only knows what else—just around the corner, Microsoft is taking this opportunity to fix current versions of some of its flagship products while any of us still care. As usual, it's difficult to know precisely which bugs these (mostly forthcoming) updates will fix, and equally tough to gauge how important the fixes will turn out to be. Here's what we know so far.

IT'S STILL A PATCH: IE 4.0 SERVICE PACK 1

WHEN LAST WE left our story, Microsoft had updated the notably buggy initial release of Internet Explorer 4.0 ("Internet Explorer 4.0, Problem Child," January 1998) to IE 4.01 ("Internet Explorer 4.01: Still Buggy," March 1998). According to Microsoft, the 4.01 upgrade fixed several of IE 4.0's most severe problems, but the company would release neither a complete list of the known bugs in IE 4.0, nor the fixes included in IE 4.01. I don't know about you, but this left me to assume that IE 4.01 might soon be followed by an IE 4.02 with even more fixes.

But Microsoft is planning instead to post IE 4.0 Service Pack 1 to its Web site to smooth some of IE 4.01's roughest spots—that's right, it installs only over IE 4.01. According to Microsoft, Service Packs are different from version number upgrades. Service Packs don't include new features and aren't "must-haves," unless a Microsoft technical support person, Web page, or program installation routine tells you otherwise. Whatever you say, guys. SP1 includes repairs that many frustrated IE 4.0 users will consider essential, and it should be available as you read this.

Service Pack 1 fixes Outlook Express's tendency to crash when your modem connection cuts out, and may correct its "Open in New Window" option, which stubbornly opens links in the same old window. SP1 also resolves incompatibilities with specific Web sites, post-IE 4.01 security problems (such as the "embed" flaw reported in last month's column), and several annoying year 2000 bugs. The easiest way to download and install SP1 is to launch IE4 or 4.01 and choose *Help•Product Updates*, or point your browser to www.microsoft.com/ie/download/.

Files from this article are available on PC World Online at www.fileworld.com. Scott Spanbauer is a senior associate editor for PC World. ■

ICON: JEFFREY PELO

BUGGED?

FOUND A HARDWARE or software bug? Tell us about it via e-mail at bugs@pcworld.com.

IN BRIEF

Dial-Up Networking 1.3

IF YOU USE the virtual private networking feature in Dial-Up Networking 1.2b, you know it's slow. DUN 1.3 will work with Windows NT 4.0 SP4 to speed things up, and it will tighten password security. Look for a link to the download at www.microsoft.com/windows/downloads.

DirectX 5.2 and Beyond

INVETERATE (OR INVERTEBRATE) gamers can stay on top of display bugs and get the latest drivers and tools by upgrading to the newest version of Microsoft's multimedia subsystem. The 3.5MB file is at www.microsoft.com/directx/download.asp. Meanwhile, the company says it will post DirectX 6.0, featuring numerous 3D display enhancements, to the same site by July.

Office 97 Service Release 2, Mystery Fix

OFFICE 97 DEBUTED with its own share of snafus and incompatibilities, and Microsoft fixed many of them with Service Release 1 (see the October and November 1997 columns for details). Now The Vendor has plans for Service Release 2, due to be posted sometime this summer (you'll find a link at www.microsoft.com/office/office97/servicerelease). Unlike many product updates, the Office 97 Service Releases aren't cumulative—to install SR2, you must first download and install SR1.

As we went to press, Microsoft couldn't tell us exactly what fixes SR2 would contain, other than an updated version of an Excel recalculation patch (see "Excel 97 Doesn't Count" in January's *Bugs and Fixes*), and a PowerPoint patch that solves an obscure-sounding year 2000 flaw. Once released, Office 97 SR2 will update any Office 97 edition or stand-alone application. In the meantime, you can download the patches for Excel (www.microsoft.com/Excel/enhancements/XL8P1.asp) and PowerPoint (www.microsoft.com/ithome/topics/year2k/product/pp97.htm).

Bugs and Fixes readers continue to send in reports of irritating Office 97 glitches. At last check, Microsoft's own online KnowledgeBase listed 200 known Office 97 bugs, some stemming from the Service Release 1 update.

PART #2425:

High-Caliber Notebook Reliability

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STORY #158:

The Bullet Hole

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[*"A slug had pierced the LifeBook's case."*]

The screen and the pointer were shot, but just for fun you hook the system up to an external monitor and mouse. Push the "on" button. And raise your eyebrows. The LifeBook notebook had taken a hit, but luckily, no vital organs were damaged and it was still running. Of course, this sort of target practice doesn't happen every day. But we do put LifeBook notebooks through our own type of "warfare"; we call it our QA process. Heat, cold and drop tests. And then we open and close select hinges thousands of times.

[*"If I don't buy reliable notebooks, the next bullet's for me,"*]

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might be the words you live by. We live by them, too. Built to withstand the daily grind of mobile computing, our notebooks deliver the leading-edge performance, human features, technical support and cost advantages you demand. Because it's not all fun and games out there—even if you happen to be in the toy business. So call us today and give the LifeBook notebook a shot. Just please, don't take that too literally.

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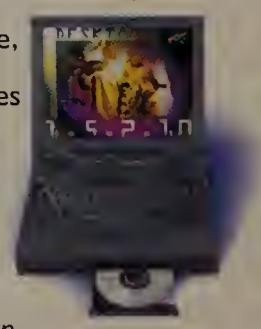

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TOP OF THE NEWS

Operating System Upstarts Challenge Windows

Alternatives to Microsoft's OS won't win the marketplace war. But for (very) specific users, they're the better choice.

BY LINCOLN SPECTOR

UPDATE

THE WAY BILL Gates sees it, a market share of nearly 90 percent isn't a monopoly. In heated exchanges with the Justice Department, Microsoft's chairman has insisted that Windows has plenty of formidable competitors. Ralph Nader doesn't agree.

In early March, Nader and the Consumer Project on Technology asked six PC makers, including Compaq, Dell, and Gateway, to offer customers the option of a non-Windows operating system such as Linux (a UNIX variant) or BeOS (a newcomer to the PC platform). At press time, the CPT had not received formal responses from any of the PC vendors.

If you've never heard of these Windows alternatives, you're not alone. In 1997, according to market research company International Data Corporation, Windows owned an 86.3 percent share of the market for desktop operating systems. And unless the Department of Justice succeeds in halting the Windows 98 juggernaut, Microsoft could very well claim the remaining 13.7 percent of the market.

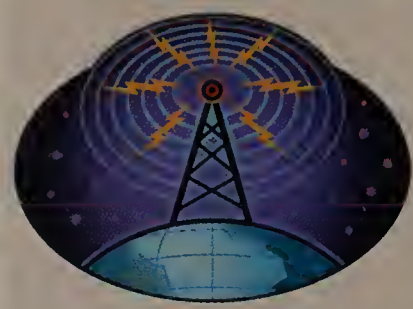
Why should you care about market share? Software vendors focus their development efforts on the most popular platforms, so that's where you'll see the most new programs. Moreover, using a minority operating system invites all kinds of compatibility problems when you want to share files and data with associates and customers.

LIMITED SOLUTIONS

BUT WHAT IF you hate Microsoft and you're fed up with Windows' notorious instability? Such sore points are leading some users to seek out alternatives. Vicki Reeves, a system administrator for the Beauregard Parish Public Library in DeRidder, Louisiana, was writing a grant in a hotel room last year when she went online to check something. "When I tried to close the modem connection," she says, "Windows froze. I lost 2 hours of editing." Soon there- ▶

ILLUSTRATION: GORDON STUDER; ICONS: JEFFREY PELO

JUST IN



Netcenter Expands

NETCENTER, the default home page for many Netscape customers and one of the most highly trafficked sites on the Web, is adding a host of new features. The enhancements include a search engine courtesy of Excite and free Web-based e-mail from USA.net, plus discussion forums, bulletin boards, professional networking tools, and online classified ads, thanks to agreements with Classifieds 2000, The Monster Board, and the Online Career Center. Lycos, Excite, and Infoseek have announced similar expansion strategies for beefing up their sites.

Rent an E-Mail System

USA.NET—whose free NetAddress e-mail service already has 3.7 million accounts—is offering an entire Web-based e-mail system for small businesses. PostOffice.Net (www.postoffice.net) isn't free; rates start at $420 a year (plus a $100 setup fee) for up to five employees. Here's what you get for your money: your own domain name, the ability to add users and passwords and to set up spam blockers, plus other features associated with more costly LAN-based e-mail products. You can configure PostOffice.Net from your Web browser. ▶

INTERNET

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after, she bought a new notebook that uses Linux.

But Linux is too difficult for all but the most technically savvy. Other solutions have their own limitations: The Mac is too expensive, the JavaOS is more convenient for IS departments than for users, and the BeOS is still too new to judge.

Though flawed, operating systems from Apple, Be, Sun, and others bring innovation to market. The best of those innovations can wind up in the mainstream.

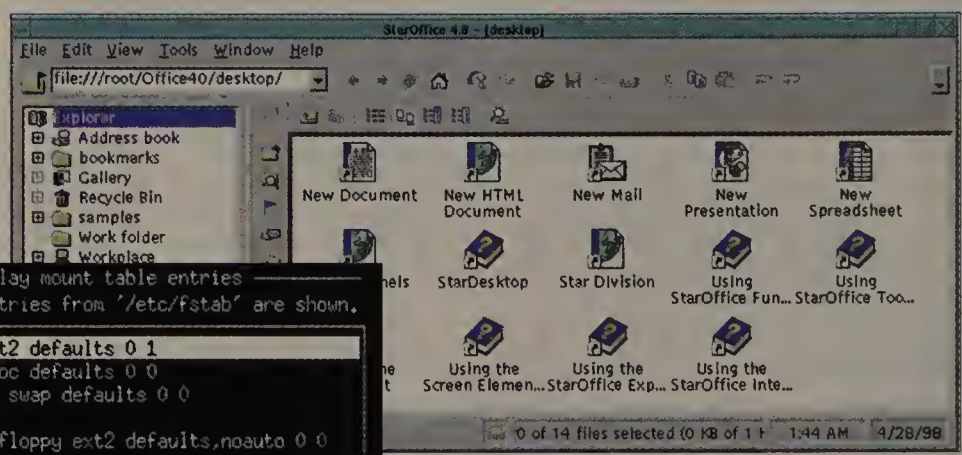
LINUX: FREE, BUT UNFRIENDLY

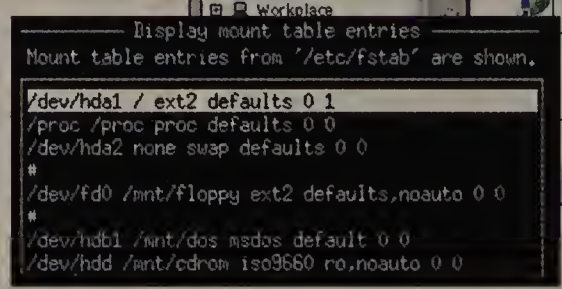
IF GATES AND company have anything to worry about on the OS front, the threat might be Linux—a variation of UNIX that comes with an unbeatable price: It's absolutely free.

Linux has acquired some high-profile industry support. Netscape cofounder Marc Andreessen has publicly praised the seven-year-old platform, and Corel offers a Linux version of WordPerfect.

Plus, you can now buy Linux as a commercial product (it continues to be available as a free download, too). Caldera and Red Hat sell it for prices ranging from $50 to $399 (depending on service contracts, number of licenses, and so on). What you're paying for, of course, is a CD-ROM, printed documentation, additional features, and somewhat easier installation. Both companies also sell Linux office suites, complete with word processors, spreadsheets, and such.

As a result of all this activity, Linux is the only non-Microsoft operating system expected to gain much in popularity. IDC predicts that Linux's share will jump from 1997's 2.4 percent to 4.2 percent by 2001, overtaking the MacOS.





WORKING IN LINUX: Some applications, such as the StarOffice suite (top screen), look and feel like Windows. But even simple jobs like installing a CD-ROM can be daunting.

Much of Linux's popularity stems from its use as a network OS, where it's proving a feasible—if not very popular—alternative to Windows NT Server and conventional flavors of UNIX, especially for running networked applications and Web servers. Some system administrators find it more stable than NT and easier to control—even when you're off site. John Morris, an independent contractor in DeRidder, Louisiana, remembers administering a network with one NT server and five Linux servers. "If one of them crashed, odds are that it was the NT box. I'd then have to come out there at 5 a.m. and kick it. You can't easily reboot an NT box remotely."

Linux will have a more difficult time cracking the desktop market. At this point, most desktop Linux users are either computer professionals—the ones administering those networks. For an operating system to compete on the desktop, it has to be easy to set up and use—and Linux is anything but. In our informal tests with Caldera's OpenLinux, we found even simple tasks like reading a fresh CD-ROM to be nightmarishly cryptic.

The upshot: Linux is worth considering if your company needs a really inexpensive platform for network applications. But as a mainstream desktop operating system, it doesn't present a viable alternative to Windows.

MAC: NOW A NICHE

THOUGH APPLE'S MacOS has lost much of its former market share, the vendor has plans to fight back. This summer, Apple will introduce MacOS 8.5, an upgrade that promises better Internet integration with new browsing capabilities, easier Internet setup, and faster file transfers. At that time, buying a Mac—

OPERATING SYSTEMS COMPARISON

Could a Windows Alternative Be Right for You?

OS	Vendor	Common uses	Hardware	Comments
BeOS	Be 650/462-4100 www.be.com	multimedia and Web authoring, desktop publishing	PCs, PowerMacs	Currently geared only to "geeks, enthusiasts, and the curious." Future versions will target designers.
JavaOS	Sun Microsystems [1] 650/960-1300 www.sun.com	data entry applications; desktop and workgroup apps becoming available	network computers designed for it	Runs applications written in Java, which is intended to run efficiently over a LAN or the Net.
Linux	Caldera 888/465-4689 www.caldera.com Red Hat Software 888/733-4281 www.redhat.com	network OS, Web server, data entry applications; some desktop apps available	PCs, Macintoshes, PowerMacs, NCs, workstations	Tough to use but very stable. Should it become friendlier, might one day be a Windows competitor.
MacOS	Apple Computer 800/767-2775 www.apple.com	multimedia and Web authoring, desktop publishing; desktop apps available	Macintoshes, PowerMacs	The only significant competitor Windows has had; now a niche product for educational and design markets.

[1] JavaOS for NCs and its coming replacement, JavaOS For Business, can be purchased only with network computers.

He Doesn't Do Windows

NAME: Eric Forster
JOB: Mortgage broker, American Discount Lenders, Los Angeles
OPERATING SYSTEM OF CHOICE: MacOS
HIS STORY: Forster bought a Mac when the computer first shipped in 1984. "I understand the system and how it works."
CONCLUSION: Last year Forster broke down and bought a PC to sit next to his Mac. Forster plans to use Windows only for software that absolutely requires it and stay with his Mac for everything else. "I wish we had more software available so we wouldn't have to go elsewhere."

and the MacOS that comes with it—will get cheaper: The company plans to ship the iMac, a $1299 machine that's aimed at the consumer market, in August.

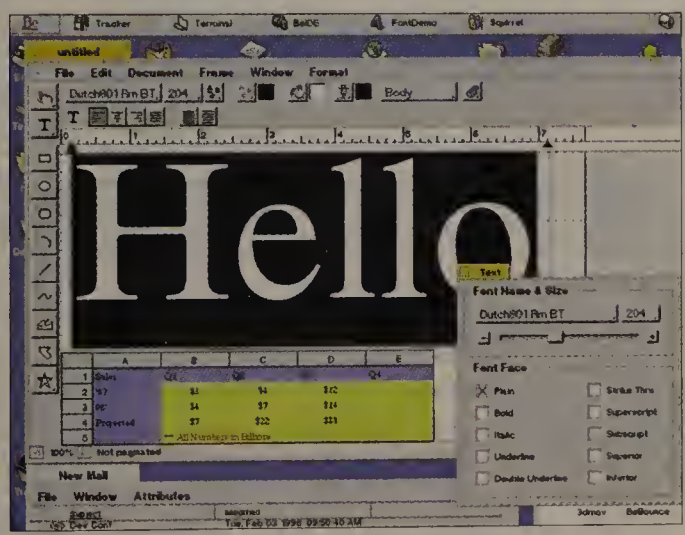
Later this year, Apple will release a network operating system code-named Rhapsody, which will act as a server for publishing and Internet applications. Rhapsody is expected to run on a number of non-Apple platforms, including Pentium systems.

But the big news should come in the second half of 1999, when Apple expects to ship MacOS X, which the vendor says will combine the power and stability of Rhapsody with the desktop support of the MacOS. The product will include advanced features, such as preemptive multitasking and memory protection. It will also run existing Mac applications, though not with the advanced features.

MacOS X will be a little late to slow the Mac's decline, however. From 1996 to 1997, the Mac's share of the OS market fell from 5.6 percent to 4.6 percent, according to IDC—an 18 percent drop. The research company predicts that the MacOS's hold will fall to 1.9 percent by 2001.

As market share slips, developers will spend less money creating programs for the platform, resulting in a dearth of software. Eric Forster, a Los Angeles mortgage broker and longtime Macintosh user, learned this the hard way. Last year, he had to buy a Windows PC because a loan processing application called Byte Qualifier wasn't available for the Mac. "I now have a PC sitting next to the Mac," he admits.

Still, the Mac remains the best machine for professional-level graphics design or desktop publishing. For instance, the colors that it displays on screen are closer to what a professional printing system turns out. But for most mainstream business users, a Windows computer is clearly a better choice.



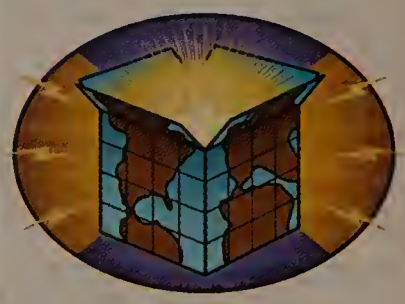
BEOS: THE NEW GRAPHIC OS? Gobe Productive, an office suite for BeOS, sports a slider bar for adjusting font size.

TO BE OR NOT TO BEOS?

IT'S HARD TO believe, but there's a new operating system for PCs. Be Incorporated shipped the first PC version of its BeOS in March (two earlier versions run only on Macs), and the company is planning another major release ▶

RCA Recalls Network Computer

THE CONSUMER NC had a short life: RCA's Network Computer, a TV set-top box for basic Web browsing, hit store shelves in November 1997, but RCA sent owners recall letters in May, offering refunds. The problem? NetChannel, the ISP under agreement to give proprietary Internet access to RCA's customers, quit the business, leaving users no route to the Net. Based on a design and software from Oracle's NCI affiliate, RCA's box sold for $249 or $199, depending on the type of keyboard, and was the only consumer NC available in U.S. retail stores. NCI is now working with other firms that may sell the product direct.



Tidbytes

DELL TO BUNDLE DSL modems: By fall, Dell's Dimension XPS R series of PCs will be available with an ADSL modem from Cisco Systems. No pricing is yet available from Dell, but Cisco sells a comparable modem for $249. The modem boasts download speeds of up to 7 megabits per second. **Low-Cost Pentium MMX-200 Notebook:** CTX's $999 EzBook 770MS-XJ comes with 16MB of RAM, a 1.6GB hard drive, a 12.1-inch dual-scan screen, and a 12X-16X CD-ROM drive. But it uses a desktop CPU, which means that its battery life is likely to be shorter than that of more-expensive portables powered by mobile processors.

PHOTOGRAPH: AMY ETRA

She Doesn't Do Windows

NAME: Vicki Reeves
JOB: System administrator, Beauregard Parish Public Library, DeRidder, Louisiana
OPERATING SYSTEM OF CHOICE: Red Hat Linux
HER STORY: To cut costs, the library switched last year from SCO UNIX to Linux.
CONCLUSION: Reeves uses Linux on the library network because it's more stable than Windows. "We know [it] can handle multitasking without crashing." She also uses Linux and Red Hat's Applixware Office Suite on her own portable.

by September. Unlike Windows 95, BeOS offers true, preemptive, reliable multitasking. It can take advantage of multiple processors. And it isn't burdened by the past: Windows' DOS foundations have been around for almost 20 years; many of the OS's speed and stability problems can be traced to its need to be backward compatible with older versions of itself.

But the $70 BeOS release 3.0 is still not ready for the big leagues, thanks largely to a scarcity of applications and limited hardware support. Even the vendor's Web site warns that version 3.0 is strictly for "geeks, enthusiasts and the curious." But version 4.0, expected in September, promises to support more hardware and to be easier to use.

More important, applications are beginning to appear, including an office suite called Gobe Productive from Gobe Software. The package contains the basics—word processor, spreadsheet, and presentation graphics—along with some novel interface embellishments. For instance, you can adjust font sizes using a slider bar, and you can see multiple views of the same document simultaneously. Another product, BeatWare's Be Basics bundles a spreadsheet with a page layout program.

Be hopes eventually to be able to attract desktop publishers, Web designers, and multimedia producers—in other words, the Macintosh crowd. But you should defer making any decision about BeOS until version 4.0 arrives. Even then, it will be a risky choice. Dataquest analyst Chris Le Tocq describes the OS competition as "a game of musical chairs, and I don't think there's a chair for Be."

JAVAOS

SUN MICROSYSTEMS released the first network computers running JavaOS this spring; system vendors including IBM and Toshiba will be following suit. These low-cost Java machines give IS folks greater control over workers' computing environments than PCs do. Specialized versions of the operating system may also find their way into handheld computers, Web-compatible phones, pagers, and even car dashboards.

The JavaOS's main selling point is portability—a Java application should run as well on the CEO's Pentium II as it does on the designer's Mac or the secretary's JavaStation. But in reality, Java programs aren't always as portable as they should be: Programmers can speed up their Java apps by adding platform-specific code that will run on one kind of machine but not on another. Also, both Microsoft and Hewlett-Packard are backing their own versions of Java, which will not be 100 percent compatible with Sun's Java standard.

Not everyone will find a JavaOS NC practical. But if your company is investing in NCs, JavaOS might allow data entry staff to run software that will also work on a manager's Windows PC.

WINDOWS FOREVER?

NONE OF THESE alternative operating systems is going to dethrone Windows. But the products are worth considering under particular conditions. Desktop publishers will continue to go with the Mac in a substantial number of situations. If you have need of a low-cost Web server and are technically proficient, you may want to give Linux a serious look. Both BeOS and JavaOS merit watching to see whether they gather more industry support. In the meantime, Bill Gates isn't worrying about these upstarts. But you can bet he's looking to them for fresh ideas.

—*Lincoln Spector*

Windows Marches On: OS Market Share

DESKTOP OPERATING SYSTEM	1997 (percent) [1]	2001 (est. percent) [1]
Windows 95/98	69.4	65.0
Windows NT Workstation	9.2	26.2
DOS with Windows 3.*x*	7.7	0.3
MacOS	4.6	1.9
Linux	2.4	4.2
DOS without Windows [2]	2.3	0.3
UNIX	1.0	0.5
OS/2 Warp	0.8	1.2
other	2.7	0.5

[1] U.S. sales of desktop operating systems as percent of market.
[2] Includes IBM, DR, and Microsoft versions of DOS.
SOURCE: INTERNATIONAL DATA CORPORATION

PHOTOGRAPH: PHILIP GOULD

PC Users Stay on the Sideline While Microsoft and the DOJ Fight It Out

ANALYSIS

THE LEGAL FIREWORKS between Microsoft and a coalition of state and federal regulators are great fun to watch, but they won't have much effect on the average PC user. At least not in the short run.

By the time you read this, thousands of copies of Windows 98 will likely have been shipped to retailers and installed on soon-to-ship computers. At press time it appeared certain that the courts would not stop the new operating system from being sold on June 25 as Microsoft promised.

ANTITRUST SUITS

BUT IF YOU CARE about the future of computing, you'd do well to watch the battle that pits the world's most influential software company against the U.S. Department of Justice and a coalition of regulators from 20 states. After a brief cease-fire collapsed in mid-May, federal and state regulators filed separate antitrust suits, seeking an injunction that would force Microsoft to fulfill the following three requirements:

- Offer a version of Windows 98 that does not contain Microsoft's Internet Explorer browser, or ship a version of the OS that contains both Internet Explorer and Netscape Communicator.
- Allow PC makers to remove either or both browsers from new machines and grant manufacturers greater control over the appearance of the screen that appears when Windows 98 loads.
- Make it easier for Internet service providers, online services, and other content providers to promote browsers that compete with Microsoft's.

If the courts grant any of these demands, Microsoft would be forced to alter Windows 98 in the future.

Microsoft maintains that it has the right to add any functions it wants to its operating system. Internet Explorer, the company says, is so tightly integrated into Windows 98 that the two simply cannot be separated. Moreover, Microsoft maintains, PC makers as well as users already have the right—and the ability—to customize up to 80 percent of the opening screen.

Some industry watchers were disappointed that regulators did not request more sweeping remedies, such as breaking Microsoft into separate companies. "The government's suit addresses mostly minor issues but it leaves unchanged the fact that Microsoft has no competition in operating systems," complains Nathan Newman, project director for NetAction, a consumer group. In a prepared statement, NetAction said it hoped the government's case would lead to broader investigations. Other experts were more upbeat. Ken Wasch, president of the Software Publishers Association, believes the lawsuits will curb Microsoft's allegedly anticompetitive behavior and that structural changes to the vendor will not be necessary.

IS NT NEXT?

WINDOWS 98 seems certain to ship, but NT 5.0, which also integrates Internet Explorer, may be in trouble. Like Windows 98, NT has added functions, including a Web server, once provided by other vendors' software. Regulators are now reportedly weighing a move to force the unbundling of some NT features.

If that happens, the current clash could escalate to all-out war. Microsoft is betting heavily on NT and clearly believes that integrating new features into an OS is fundamental to the company's business model. In any event, expect Microsoft to stick to its guns.

—*Brian McWilliams* ▶

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The Amazing Expanding OS

MICROSOFT'S operating systems have been devouring stand-alone utilities, games, and even programs for nearly a decade. Here's a sampler of one-time apps now reduced to the ignominy of check boxes.

WINDOWS 3.0 (1990)
Macro Recorder, Solitaire, File Manager, extended memory management

WINDOWS 3.1 AND 3.11 (1992 to 1994)
TrueType fonts, fax (Windows for Workgroups), networking (Windows for Workgroups)

DOS 6.0 (1993)
File compression, disk defragmentation and backup, automated memory management, disk caching

WINDOWS 95, OSR2 (1995 to 1997)
Quick View file viewer, browser, dial-up networking, CD player, system monitoring tools (Net Watcher, Resource Meter, System Monitor)

WINDOWS 98 (1998)
TV broadcast services (Wavetop, WebTV for Windows), speedup utilities (Fast Boot, Application Launch Acceleration, Map Cache), system maintenance utilities (Disk Cleanup, Registry Checker, System File Checker)

ILLUSTRATIONS: GORDON STUDER

Netscape's Communicator 5 Leaps Into the Unknown

UPDATE

ARE YOU wondering what the next version of the world's most popular browser will look like? Of course you are. And so are we. The next revision of Netscape's Communicator is one of the best-kept secrets in the history of software development.

We know that a beta version of Communicator 5 will hit the streets late this year, and that the program will continue to be free. We also know that, like Windows 98, it will enable you to view files on your desktop or LAN, similar to the way you'd look at a Web site. But beyond that, even the Netscape folks don't know precisely what the program is going to look like.

The reason: Netscape has made the code for Communicator public. Which means that developers all over the world are hacking away at the program, adding features and fixing problems. Netscape will incorporate the best of these tweaks—along with the work of its own programming staff—into Communicator 5.

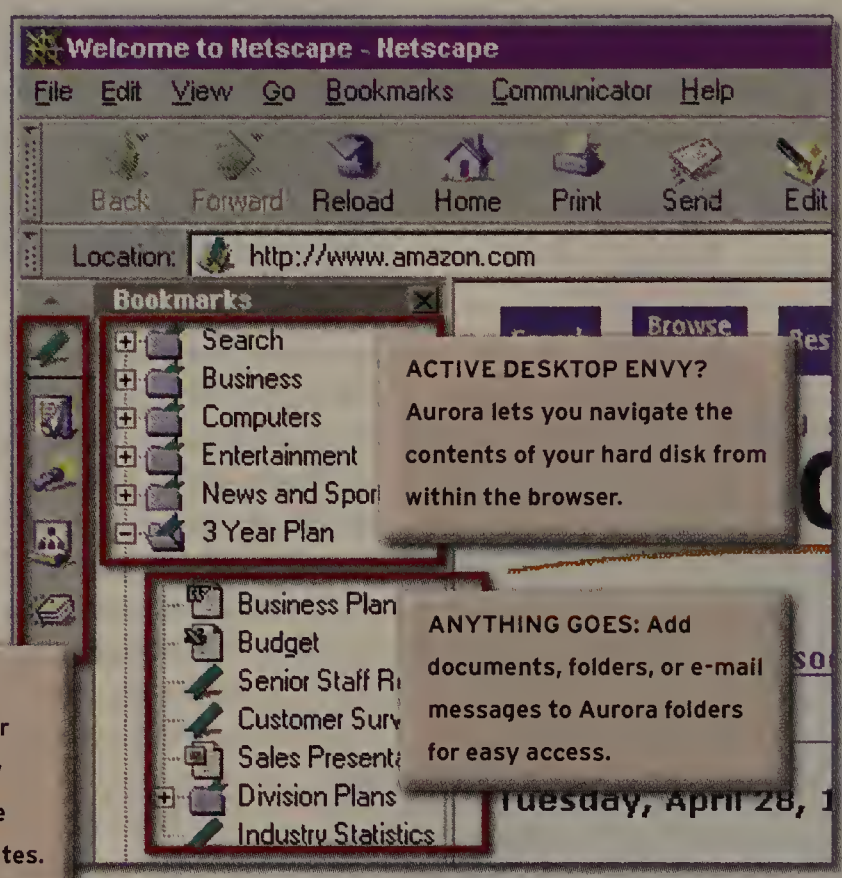
AURORA: DAWN OF A NEW METAPHOR

EVEN THOUGH Communicator 5 is still in development, enough bits and bytes have leaked out to let us sketch an outline of the program.

First and foremost, it will include Aurora, a new "browsing metaphor" that enables you to view the contents of the Web, your local hard drive, and the LAN—meaning Web pages, word processing documents, e-mail messages, whatever—through a single interface. Aurora lets you organize those contents in any way you want—by project, by theme, and so forth. And it allows you to navigate them by clicking icons in the browser's left pane rather than by typing URLs or paths or repeatedly clicking the Back and Forward buttons. Sound familiar? Yep: Aurora is Netscape's answer to Windows 98's Web-centric interface.

Other new features in Communicator will likely include:

- improved calendaring and messaging tools (to lure Notes and Exchange users)
- new buttons, menus, and other navigational tools for moving through the company's newly revamped Netcenter site (www.netcenter.com)
- support for XML (extensible markup language), a new standard that's gaining popularity among Web designers
- fixes to improve both performance and stability
- a smaller footprint (well, we can hope, can't we?).



But that's not all. The new Communicator will sport features that Netscape hasn't even thought of. Here's why.

FREE THE CODE

NETSCAPE, IN A seemingly hippie-dippy bit of selflessness, has released Communicator's source code—also known as Mozilla—for the whole world to see, use, and tinker with. Only time will tell whether this is a smart move or a shot in the foot. In the meantime, thousands of programmers worldwide are enjoying an unprecedented free-for-all. Here's how this digital Codestock works, along with a few possible scenarios of its impact on consumers.

Anybody can stop in at the Mozilla download page (www.mozilla.org/download.html) or one of its many mirror sites and get the source code—an uncompiled C++ program. Such code is unintelligible to most mortals (as the download page puts it, "If you have never compiled and debugged a very large C/C++ program before, all that downloading...will do for you is use up a lot of disk space"). But it's a gold mine for programmers, because it allows them to look inside the program and even to modify it.

250,000 DEVELOPERS

NETSCAPE ISN'T JUST letting developers snoop inside the code. Under the terms of the Mozilla program, programmers will retain rights to the code once they've enhanced it with additions of their own. Consequently, users are free to take the source code, tweak it as they wish, and then sell the results on the open market—without paying Netscape any royalties. In return, Netscape asks that developers post those tweaks on the Mozilla site and allow Netscape to incorporate any or all of them it desires into the next version of Communicator.

So in theory, Netscape has just expanded its R&D staff by about 250,000 people (the number of code downloads as we go to press). Of course while all this off-site development is going on, Netscape's paid staff will continue to develop enhancements of their own. ▶

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Netscape officials say that later on this year, the company will take a "snapshot" of the code—combining the best contributions from its own development team and from participants in the Mozilla program—and release that composite as the first beta of Communicator 5. Contributors of the accepted code will be recognized but will not be compensated; their names will be listed on the Mozilla site, and they will be added to the credits that roll when you type **about:** in the browser's address box.

According to Netscape, this high-tech giveaway is a win-win proposition. Sure, some clever programmer could conceivably create a leaner, meaner version of Communicator and steal some of Netscape's market share. You can already find Communicator clones—featuring improved encryption and foreign-language support—on the Web. But such clones won't drain any money from the company's coffers, because Communicator is already free.

In theory, Netscape has just expanded its R&D staff by about 250,000 people.

More importantly, commercial developers could get into the act with some Netscape-friendly versions of their products. As an example, Qualcomm could develop a version of its popular Eudora e-mail program that you could use from within Communicator. And a speech-recognition company could come up with a hands-free browser. Netscape figures that the more comfortable corporate users are with the browser or with one of its variants, the better they're likely to feel about Netscape's server products, and the more often they'll visit Netscape's Web site—both money makers for the company.

In short, the sky's the limit; and Netscape, programmers, other software vendors, and end-users all stand to benefit. As a result, Communicator 5 should represent a major shot across Microsoft's bow. By the beginning of 1999, when both Communicator 5 and the next version of Internet Explorer 5 are likely to be available, the browser wars should be raging full bore once again.

—*Yael Li-Ron*

The Cyrix M II-300: Pentium II Power for Less

EVERYONE'S time is valuable these days. But given the choice, would you be willing to sacrifice 5 seconds every now and then if you could save about $400? We would.

Consider the new CyberMax ValueMax B8 that just landed in the PC World Test Center. It's the first system we have seen that's built around Cyrix's new M II-300 chip. The B8 ran our PC WorldBench 98 suite of business applications as fast as the average Pentium II-300, yet it costs much less.

Packing 64MB of SDRAM, a 512KB secondary cache, a 17-inch monitor, an 8GB hard disk, a 56-kilobits-per-second modem, a 24X–32X CD-ROM drive, wavetable sound, an 8MB Symmetric GliderMax II graphics card, Altec Lansing speakers, and Microsoft Office 97, this maxed-out PC comes in at a mere $1569. That's $390 less than a similarly configured NexStar 208W PII-300 from NexTrend (a comparable second-tier company) and about $450 less than the Gateway GP6S-300 Pentium II-300 with much the same hardware. In fact, when we put these systems through their paces, Gateway's machine finished a lengthy series of operations in Microsoft Word in 178 seconds, a scant 5 seconds faster than the CyberMax. Overall, the CyberMax system posted a WorldBench 98 score of 161, versus 165 for both Gateway's and NexTrend's systems—a difference you'd never notice.

CYBERMAX'S VALUEMAX B8 is the first system based on Cyrix's M II-300 CPU.

BOTTOM LINE

WE ALSO SUBJECTED the systems to a test that involved running five graphics and multimedia applications. In these, both of the the Intel-based machines we tested for this story performed significantly better than CyberMax's offering, although the NexTrend's great score on 3D games can largely be attributed to its Nvidia Riva 128 graphics chip. Bottom line: The CyberMax system is a good choice for bread-and-butter business applications, but if you're in the market for top-notch game and graphics performance, you'll need to look elsewhere. ▶

PHOTOGRAPH: KEVIN CANDLAND

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DESKTOP PCs: BUSINESS APPS — TEST REPORT

Cyrix M II-300 vs. Intel PII-300: Neck and Neck

SYSTEM	CPU	RAM (MB)	Secondary cache (KB)	PC WorldBench 98 score	Application test time (Faster ◀ ▶ Slower)
CyberMax ValueMax B8	M II-300	64	512	161	
Gateway GP6S-300	PII-300	64	512	165	
NexTrend NexStar 208W PII-300	PII-300	64	512	165	
Sony VAIO PCV-E203	Celeron-300	48	none	129	
Average of 24 other PII-300 systems	PII-300	64	512	161	
Average of 28 PII-333 systems	PII-333	64	512	171	
Average of 8 PII-266 systems	PII-266	64	512	151	

TEST PC WORLD CENTER **HOW WE TEST** All systems are tested with PC WorldBench 98, PC World's application-based benchmark. A higher PC WorldBench 98 score is better. For more details on our benchmark and how we run it, see PC World Online (www.pcworld.com/testing). Data based on testing conducted by the PC World Test Center. All rights reserved.

More CPU options mean better deals. And Cyrix's introduction of the M II-300, which sells to PC makers at about half the price of a Pentium II-300 chip, seems certain to deflate prices right down to the rims. The M II-300 is a faster version of the 6x86MX chip, which Cyrix introduced a year ago. Cyrix will offer an M II-333 and an M II-350 by summer, the latter designed to work with a new 100-MHz motherboard. (The numeric suffixes are Cyrix's own ratings, which refer to equivalent Intel Pentium II performance rather than to clock speed; the M II-300 actually runs at 233 MHz.)

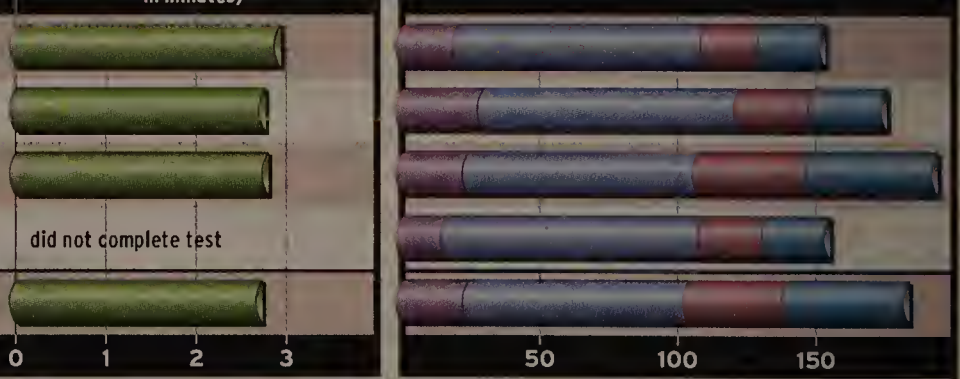
Whether a big-name PC company will ever market an M II–based system is another question. Apart from IBM (which manufactures Cyrix chips), Acer and Compaq are the only major vendors that have been willing to take a chance on Cyrix, and neither still offers a Cyrix-based desktop PC.

Cyrix officials say that their chip, which costs about the same as Intel's new Celeron chip, leaves the larger company's offering in the dust—and when it comes to business apps, they're right. In our PC WorldBench 98 tests, the CyberMax M II-300 machine performed 25 percent faster than the fastest Celeron system we've tested (the Sony VAIO PCV-E203, which is built around Intel's brand-new 300-MHz Celeron). It's true that Sony's system had only 48MB of system memory compared to the CyberMax's 64MB, but other Celeron PCs we've tested did have 64MB and ran even slower (see this month's *New Products*). The CyberMax was less impressive with games and multimedia. In fact, Sony's Celeron sys- ▶

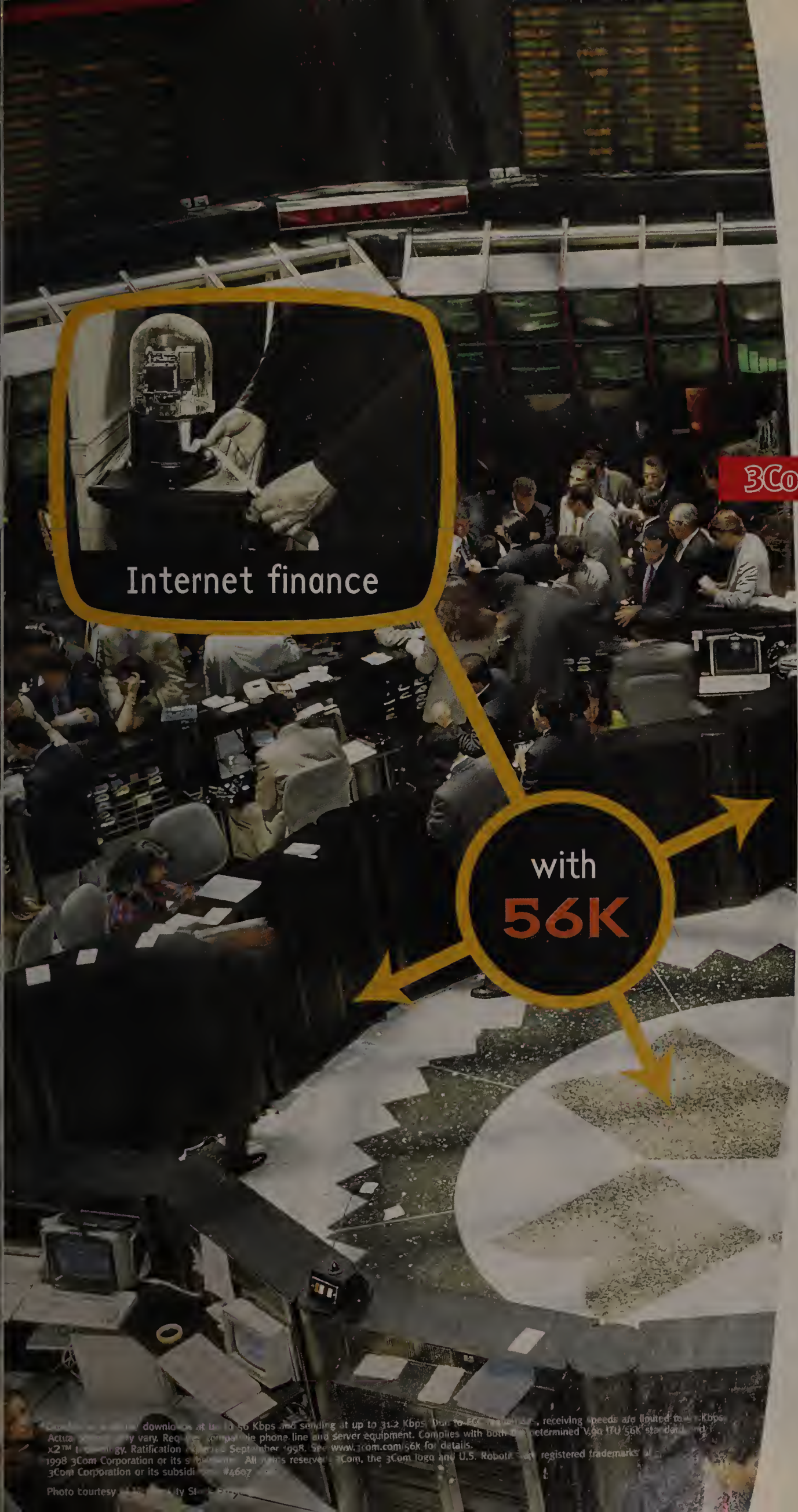
DESKTOP PCs: GRAPHICS APPLICATIONS — TEST REPORT

Pentium II CPUs Still Win the Graphics Game

SYSTEMS	CPU	RAM (MB)	Video memory (MB)	PowerPoint test (time in minutes) (Faster ◀ ▶ Slower)	Playback tests (frames per second) (Slower ◀ ▶ Faster)
CyberMax ValueMax B8	M II-300	64	8		
Gateway GP6S-300	Pentium II-300	64	8		
NexTrend NexStar 208W PII-300	Pentium II-300	64	4		
Sony VAIO PCV-E203	Celeron-300	48	4	did not complete test	
Average of two PII-333 systems	Pentium II-333	64	8		



TEST PC WORLD CENTER **HOW WE TEST** In Microsoft PowerPoint 97, we run and time a script that builds a 50-slide presentation by importing text, adding an AVI clip, graphics, charts, and animated transitions. In Caligari TrueSpace 3, a 3D modeling program, we play back a tutorial sequence that uses AGP textures and reports the average frame rate achieved. Using Microsoft Active Movie, we play back a looping AVI clip stretched to twice its native resolution, while running a Macromedia Director 6 animation in the foreground. We also execute self-running demos in two Direct3D games, Criterion Redline Racer and Acclaim Turok Dinosaur Hunter, both of which report average frame rate.



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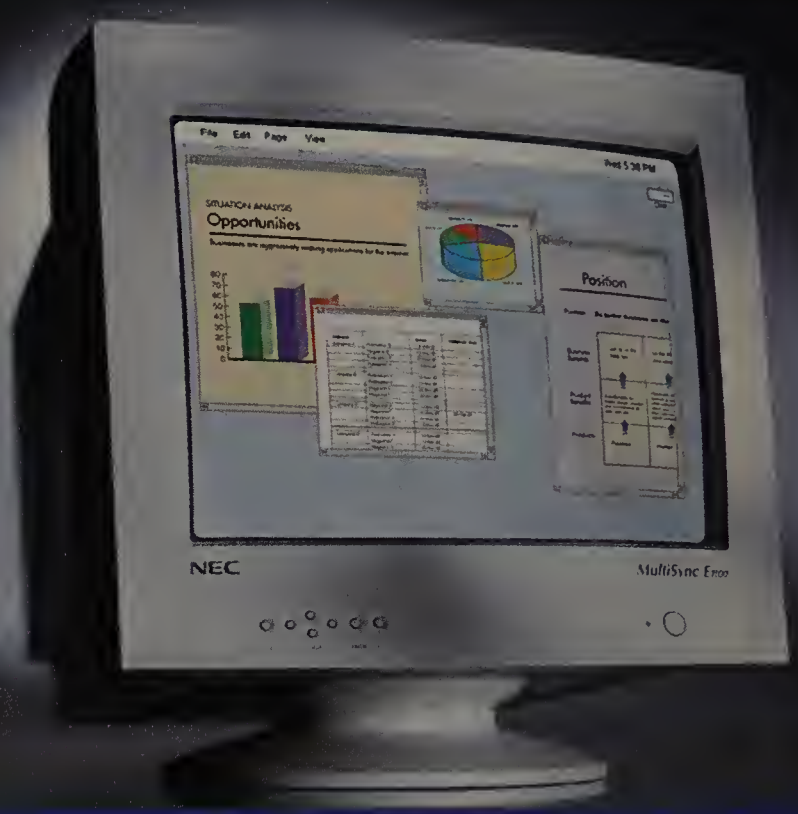

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tem edged past the CyberMax in Redline Racer and Director.

Despite a solid track record of competitive performance at a good price, Cyrix-based systems haven't done well in the marketplace. Analyst Mike Feibus of Mercury Research likens Cyrix to generic pain remedies. "Go to the Safeway, and you see the generic ibuprofen right next to the Advil," he says. "Generics cost a lot less, but people still buy a lot of Advil." The analogy isn't perfect, since the M II and the Pentium are hardly identical. But smart buyers—especially those who couldn't care less about twitch games and high-end graphics—should definitely give the Brand X preparation a long, hard look.

—*Eric Knorr*

Is a $400 PC on the Horizon?

IF A COMPUTER cost $400 and was small enough to plug into the dashboard of your car or to sit in a flat panel display in your kitchen, would you buy it? Brian Halla, CEO of National Semiconductor, hopes to confront you with that choice next year.

Halla, whose company bought Cyrix last year, says National is developing a microprocessor that will perform functions now requiring 12 additional chips. The "PC-on-a-chip," he says, means lower manufacturing costs, less power consumption, and flexibility to build computers in shapes you never thought you'd see. Whether the new chip appears in a PC or an "information appliance," it will be highly integrated, melding a Cyrix CPU with graphics, sound, and much of the support logic usually strewn across a motherboard, saving space, power, and manufacturing costs.

CHEAPEST PC YET

NATIONAL Semiconductor vice president Steve Tobak says mid-1999 you'll see the new chip in fully featured $499 multimedia PCs, sans monitor. Not much further off, he says, is a $399 PC.

Analysts greet those claims with skepticism. They figure that even if the chip works as advertised, the cost of other components will keep prices above the levels touted by Cyrix.

Moreover, combining so many functions on one chip has a disadvantage. Owners of more-modular PCs can upgrade subsystems, including graphics and sound, as technologies evolve. But stick everything on one chip, and you must live with the whole package. Nor could you replace the Cyrix chip with one made by Intel or Advanced Micro Devices.

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ValueMax B8
Street price: $1569, CyberMax
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THE NETSERVER E50 from Hewlett-Packard is one of a slew of new low-end servers costing $3000 or less.

Sub-$3000 Servers Bring Real Networking to Small Businesses

WINDOWS 95 AND its built-in peer-to-peer networking may be fine for sharing files and a printer among a handful of PCs. But what if your business is growing rapidly and all those PCs are fighting over resources like a roomful of preschoolers?

If your old ad-hoc network can't cut it anymore, maybe you should step up to a dedicated network server. And if that's the case, or if your existing server is simply beginning to show its age, a new generation of low-end servers makes this a great time to upgrade.

Servers have traditionally been expensive and complex, requiring the attention of a full-time network administrator. But as the desktop PC price war percolates upward, major PC vendors are beginning to offer well-appointed servers for less than $3000 (see "Network Power for Small Business"). In some ways, these systems resemble beefed-up PCs. They come outfitted with the same Pentium II processors and the same amounts of RAM that you typically find in today's power desktops. The key differences: These servers are equipped with speedy SCSI hard drives and network management utilities that make setup and maintenance easy enough for even nonexperts. "At this point, the hardware is pretty much a commodity," says Chris Carrigan, associate analyst at Summit Strategies. "The real differentiators are software and service."

NO-BRAINER NETWORKING

THE HEWLETT-PACKARD NetServer E50 is a case in point. The unit I tested (street price: $2589) had a 333-MHz Pentium II CPU, 64MB of RAM, and a 4GB Wide Ultra SCSI hard drive; the 4GB SCSI tape backup is a nice enhancement. Like many bargain-basement desktop PCs, the E50 comes without a monitor. More important, it lacks an operating system: You'd have to pay an additional $1129 for a ten- ▶

PHOTOGRAPH: KEVIN CANDLAND

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Circle 159 on reader service card

user version of Windows NT 4.0 Server, or $995 for a five-seat license to NetWare for Small Business 4.11.

You don't need advanced networking expertise to run the NetServer E50. About 2 hours after opening the box, I had it running without a hitch in my six-PC network. One key is HP Navigator (not to be confused with Netscape's browser), a bootable CD-ROM that automatically handles setup and installation of the NOS. The prerelease version I tested supported NT, Novell NetWare, IBM OS/2, Banyan VINES, and SCO UNIX. I simply inserted the CD-ROMs when prompted and answered a few basic questions; Navigator took care of the rest.

HP TopTools, the other key software component, continuously monitors the server software and hardware. If problems develop, pop-up warning messages appear on designated systems. To handle problems you can't fix yourself, the NetServer E50 includes still another utility that enables your dealer to diagnose the cause via modem.

Rounding out the E50's software bundle, Stac Replica automatically keeps a current tape backup of the server's hard drive. The NetServer E50 even monitors the condition of the tape drive and the storage media; all you need to remember is to change tapes.

SERVERS: WHO NEEDS THEM?

HEWLETT PACKARD'S E50 is just one in a wave of servers aimed at low-end users. As a group, these machines are both cheaper and more powerful than the entry-level servers of yesteryear. Their combination of a PII-300 or -333, 64MB of RAM, and 4GB hard drives should provide plenty of horsepower—and breathing room—for small businesses (up to 50 users) that want to share files and printers, send e-mail, and deploy small-scale shared applications such as accounting or a basic intranet.

On the other hand, if you have more users connected, run more-demanding applications (such as a full-fledged corporate database), or want to use the box as an Internet server, you should bump the RAM up to 128MB or 256MB and increase your hard drive capacity. And if you expect your business eventually to comprise more than 100 PCs, or if you plan to keep adding network-based applications, consider starting with a mid-range server, currently priced at around $4000 to $5000. Otherwise, one of these low-end servers could be just what your business needs to get its network out of ad hoc.

—*Stan Miastkowski* ■

Budget Routers Connect Network to Net

EQUIPPING every PC in your office with a modem, a dedicated phone line, and an account with an Internet service provider can get expensive fast. But if the PCs are networked, you can get them all online with a single modem and one account. You have two options.

The first solution is a proxy server—software that will manage a modem installed in your server. But if you need to connect more than a few users, a router is a better choice. Just plug a modem into one of these boxes, connect it to your network, and voilà—Internet access for everyone.

SHARING THE WEALTH

INTEL'S $499 InBusiness Internet Station (www.intel.com), for example, provides shared modem access for 6 to 12 users and supports ISDN connections. For heavier use, 3Com's $745 Dual Analog Router (www.3com.com) has two built-in V.90 modems. With two standard phone lines and an ISP that supports Multilink Point-to-Point Protocol (unfortunately, such ISPs are rare), the Dual Analog Router can theoretically boost performance by 40 percent over a single-line connection. It also permits remote access. If your ISP doesn't support MPPP, Ramp Network's $799 WebRamp M3i (www.rampnet.com) has two V.90-capable modems and is said to deliver near-ISDN performance from any V.90-capable ISP. The company says you can hook up a third external modem to accelerate the transfer rate further.

BUDGET SERVERS — VITAL STATS

Network Power for Small Business

SERVER	Street price [1]	CPU	RAM (MB)	Hard drive	Reader service no.
Compaq ProSignia 200 6/300 Model 4300 800/345-1518 www.compaq.com	$2440	PII-300	32	4GB Wide Ultra SCSI	798
Dell PowerEdge 2300 888/562-3355 www.dell.com	$3166	PII-333	64	4GB Wide Ultra SCSI	799
Digital Server 1210 800/344-4825 www.windows.digital.com	$2582	PII-300	64	4GB Wide Ultra SCSI	800
Gateway NS-7000 333 800/846-4208 www.gateway.com	$2449	PII-333	64	4GB Ultra SCSI	801
Hewlett-Packard HP NetServer E50 800/752-0900 www.hp.com/go/netserver	$2589	PII-333	64	4GB Wide Ultra SCSI	802
IBM Netfinity 3000 847616U 800/426-7255 www6.pc.ibm.com	$2579	PII-300	64	4GB Wide Ultra SCSI	–
Micron NetFrame 3100 888/643-8799 www.micronpc.com	$4299 [2]	PII-350	64	4GB Wide Ultra SCSI	803
NEC Express5800 ES1200 888/863-2669 www.nec-now.com	$2247	PII-266	32	4GB Wide SCSI	804

[1] Price excludes monitor and, unless otherwise indicated, network operating system.

[2] Includes ten-user Windows NT Server 4.0.

ILLUSTRATION: JEFFREY PELO

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RAM (memory)	• 32MB	• 64MB	• 128MB
hard drive (storage)	• 5GB	• 8.4GB	• 14.4GB
monitor (viewable)	• 15" (13.9" viewable)	• 17" (15.9" viewable)	• 19" (18" viewable)
sound	• Altec Lansing® GCS-100 Speakers	• Boston Acoustics® Speakers	• Boston Acoustics MediaTheater™ Speakers
software	• MS® Home Essentials	• MS Home Essentials	• Microsoft® Choice
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RAM (memory)	• 32MB	• 32MB	• 64MB
hard drive (storoge)	• 2GB	• 2GB	• 4GB
drive (removeoble storoge)	• 3.5" Diskette & CD-ROM	• 3.5" Diskette & CD-ROM	• 3.5" Diskette & CD-ROM
software	• Microsoft® Office 97 Small Business Edition	• MS® Works 4.5	• MS Office 97 Small Business Edition
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sound	• Boston Acoustics® MicroMedia™ Speakers	• harman/kardon® Dolby® ProLogic Speakers	• harman/kardon Dolby ProLogic Speakers
processor (speed)	• Intel® Pentium® II Processor 266MHz	• Intel Pentium II Processor 333MHz	• Intel Pentium II Processor 400MHz
hord drive (storage)	• 2GB	• 8GB	• 14.4GB
RAM (memory)	• 32MB	• 64MB	• 128MB
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Chuck and Susan's amusement park

For the Lanphier's, we started with the D6-333 and added and subtracted until we found a system just right far them:

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- No Speakers
  (they already have a premium sound system)
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- Epson Stylus COLOR 800 Ink Jet Printer **$299**
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NEW PRODUCTS

Don't Be Fooled by So-Called Bargain PCs

DESKTOPS

SOME "BARGAIN" desktops powered by low-end processors aren't bargains at all. We expected to see Intel's Celeron-266 chip (which gives PC vendors a low-cost way to put "Intel inside") in cheap systems. But some Celeron-266 PCs cost $1500 or more with a monitor—too expensive for what you get. We tested preproduction versions of Unicent's Avanta L266 and Packard Bell's Multimedia 710. Both ran like Pentium MMX-233 machines on business applications. With 15-inch monitors and 64MB of RAM, the Unicent and Packard Bell cost $1149 and $1548, respectively.

Then, just before we went to press in May, reacting to the negative reception that the Celeron-266 chip was getting, Intel moved up the release date for a 300-MHz Celeron. Celeron-300 systems will now ship in late June or July, instead of in the fall. Like the Celeron-266, the Celeron-300 processor lacks a secondary cache, which hurts its speed. Sony had planned to introduce two Celeron-266 machines in late June, but decided to add a Celeron-300 system. We tested a preproduction version of Sony's Vaio PCV-E203. With 48MB of RAM, it costs $1399, plus $529 for a fancy monitor. This Celeron-300 machine ran about 11 percent faster than the two Celeron-266 systems and 5 percent faster than a typical Pentium MMX-233 PC.

IBM's Aptiva E84, the first PC we've seen with Advanced Micro Devices' K6-300 chip, performs better—much like a Pentium II-266—on business applications. But at $1698 with a 15-inch monitor, it's no bargain considering its meager graphics performance.

The good news: $1499 Pentium II-266 systems were starting to pop up at press time and should be available by the time you read this.

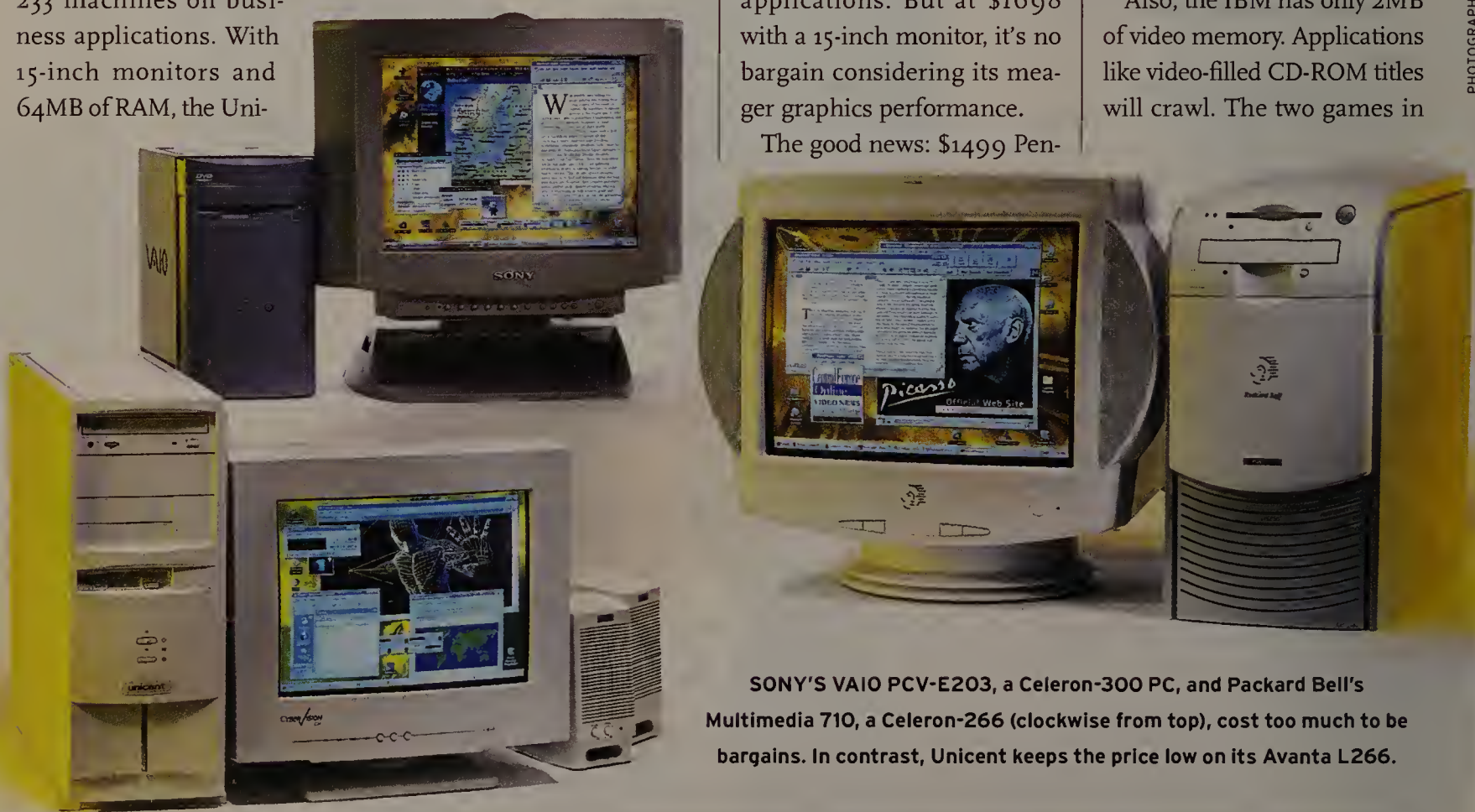
GRAPHICS ISSUES

IBM'S HOME-ORIENTED Aptiva E84, which earned a PC WorldBench 98 score of 147, does well with productivity apps. It ranks just below the average score of 151 for Pentium II-266 systems. But the Aptiva, like the Celeron-based systems we tested, has weak graphics capabilities compared with a Pentium II-266 PC with a good graphics card and 4MB of graphics memory.

Don't blame AMD or Intel: All four PC vendors integrated slow ATI graphics accelerators into the motherboards.

Also, the IBM has only 2MB of video memory. Applications like video-filled CD-ROM titles will crawl. The two games in

PHOTOGRAPHS: MARC SIMON



SONY'S VAIO PCV-E203, a Celeron-300 PC, and Packard Bell's Multimedia 710, a Celeron-266 (clockwise from top), cost too much to be bargains. In contrast, Unicent keeps the price low on its Avanta L266.

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FOR MORE PRODUCT news and the latest announcements, check out the PC World Daily News Service at www.pcworld.com/news.

AMD'S NEW K6-300 CHIP helps IBM's Aptiva E84 run business apps well. But the Aptiva costs a bit much compared with Pentium II-266 systems.

our graphics test suite, Redline Racer and Turok, didn't run correctly: The system couldn't handle the 3D objects and textures.

With 64MB of RAM, a 4GB hard drive, and a 10X–24X CD-ROM drive, the Aptiva E84 costs too much. In May, Gateway offered the GP6-266—a Pentium II-266 system with 32MB of RAM, a 5GB hard drive, a 13X–32X CD-ROM drive, an Accelerated Graphics Port graphics card with 4MB of SGRAM, and a 15-inch monitor—for just $1499. Quantex's $1349 QP6/2266 M-1x, a PII-266 system, came with 32MB of RAM, a 3.2GB hard drive, a 12X–32X CD-ROM drive, a 56-kilobits-per-second modem, an STB Nitro 3D AGP graphics card with 4MB of SGRAM, and a 15-inch monitor. (It was $1499 with a 17-inch monitor, plus $80 to $100 for a 32MB RAM upgrade.)

STRANGE CELERON PRICES

SO YOU CAN BUY a Pentium II-266 PC that runs business applications about 30 percent faster than a Celeron-266 and 17 percent faster than a Celeron-300, and has superior graphics capabilities, for $1499. Why would you pay *more* for a Celeron system?

On business apps, the average Pentium II-266 system with 64MB of RAM posts a PC WorldBench 98 score of 151. Sony's Vaio PCV-E203, with the Celeron-300 chip and 48MB of RAM, scored 129. The Unicent and Packard Bell Celeron-266 machines, with 64MB of RAM, earned scores of 115 and 117, respectively—slightly below the average score of 124 for Pentium MMX-233 systems.

Sony's Vaio PCV-E203 has a fast 6.4GB Maxtor hard drive, a DVD-ROM drive, and 4MB of graphics memory—but 3D games like Turok still looked rough in our tests. Sony bundles a $529 monitor with integrated speakers, subwoofer, microphone, and USB passthrough port—oddly fancy for the system. A $499 version drops the USB port, but won't save you much. (For $999, Sony offers a Celeron-266 system, the PCV-E201, with just 32MB of RAM, a 12x–24x CD-ROM drive, 2MB of graphics memory, and the same monitor options. It's no deal.)

Unicent's $1149 Avanta L266 has a 14X–32X CD-ROM drive, a 56-kbps modem, and a 3.2GB hard drive. With only 2MB of video memory, it runs 3D games poorly. But at least it's inexpensive.

The Packard Bell PC, overpriced at $1548, has a 6.4GB hard drive, a 56-kbps modem, a 12X–24X CD-ROM drive, and 4MB of video memory.

Perhaps bargain PCs will look better this fall, when Intel plans to ship a Celeron-333 with secondary cache to improve performance. Celeron-266 and -300 system prices should drop then.

For now, the only PC in this group I can recommend is Unicent's—strictly for business apps and only if $1200 is your limit. If you can spend $1499, you're wiser to buy a Pentium II-266 with at least 4MB of graphics memory.

—*Dean Andrews* ▶

Aptiva E84

PRO: Thanks to AMD K6-300 chip, runs business applications fastest of these four systems.
CON: Only 2MB of video memory, poor graphics performance.
VALUE: Pass, unless price falls.
Street price: $1698 with 15-inch monitor
IBM
800/426-7235 x 4340
www.ibm.com/aptiva

Avanta L266

PRO: Cheapest system in group.
CON: Small hard drive, only 2MB of video memory.
VALUE: Okay as a budget system for productivity apps.
Street price: $1149 with 15-inch monitor
Unicent Technologies
800/308-3614
www.unicent.com
READER SERVICE NO. 794

Multimedia 710

PRO: Has 4MB of video memory.
CON: Unimpressive speed for the price.
VALUE: Celeron-266 system is not a good deal.
Street price: $1548 with 15-inch monitor
Packard Bell NEC
800/733-5858
www.packardbell.com
READER SERVICE NO. 795

Vaio PCV-E203

PRO: Comes with DVD-ROM drive.
CON: Only 48MB of RAM.
VALUE: Celeron-300 system costs too much, though bundled with a fancy monitor.
Street price: $1928 with 15-inch monitor with USB port
Sony Electronics
888/315-7669
www.sony.com/pc
READER SERVICE NO. 796

HP 2000C: Fast Color Ink Jet Bucks the Rules

PRINTER

I THOUGHT I KNEW the two eternal truths about color printers: Ink jet printers have modest price tags but work slowly and consume lots of expensive supplies if you print more than a handful of pages a week. Color laser printers work quickly and meet the demands of heavier use, but at $2500 or more they're too expensive for most people or departments to consider. Then I got my hands on Hewlett-Packard's new 2000C, a color ink jet that wrote its own rules.

The $799 price may seem steep at first, but the 2000C looks to be a workhorse that will be a hit with individual power users and workgroups that can't justify a color laser. (HP also offers the 2000CN, a network-ready version.)

The printer gets its speed from four oversize printheads that can squirt a wide swath of ink onto the page in one pass. In my tests, performance was truly impressive: The 2000C took less than 2 minutes to print a ten-page text document, 50 seconds to produce a color presentation slide, and just over 2 minutes to reproduce a full-page photo. Better yet, it achieved those speedy print times without defaulting to low-resolution settings, as some fast printers do.

GREAT PRICE: HP'S $799 INK JET, THE 2000C, is fast enough for a group, and much less expensive than color laser printers.

Overall, print quality for both text pages and color graphics was some of the best I've seen from an ink jet. Color photographs on HP's special paper were vivid and realistic. Although the 2000C is capable of handling the vast majority of typical office print jobs, I would still want access to a monochrome laser printer for my most important correspondence. No ink jet produces text that looks quite as crisp as the output of a 600-dots-per-inch laser.

CARTRIDGES THAT KEEP GOING

MANY INK JETS run through expensive ink cartridges so quickly that before long, you've spent more on ink than you did on the printer. But the 2000C's four jumbo-size cartridges can be replaced individually when they run dry (reducing maintenance costs) and hold a generous supply of ink—enough, HP says, for 1750 color pages or 1400 black-and-white pages (using an optional high-capacity black cartridge). The company estimates that the cost for each printed page works out to a thrifty 2.5 cents for a black-and-white text page and anywhere from a nickel to 8 cents for a typical color page. (With some other ink jets, you'll pay 4 cents or so for a monochrome page, and 14 cents for a color one.)

As pleasing as the 2000C is in most respects, it possesses a couple of flaws. I wish the printer were quieter: It clanks away in a distracting fashion as it spits out pages. More importantly, unlike laser printouts, the 2000C's output isn't completely water-resistant. I occasionally smudged pages slightly when I grabbed them the moment they emerged from the printer. My advice: Keep beverages away from printed pages until you're sure the pages have dried. Even then, pages that get really soaked may smear.

Overall, the HP 2000C is a fast color printer that doesn't cost a ton of cash or gobble up pricey supplies. It fills a gap in today's printer market. And it even buys you some new, smart features that are unusual at any price. For example, it automatically senses when you insert transparencies and adjusts accordingly for the best print quality.

—*Harry McCracken* ▶

Hewlett-Packard 2000C

PRO: Very fast, good print quality, no-hassle maintenance.

CON: Ink can smear, noisy.

VALUE: Bridges the gap between color ink jets and lasers; a printer that is worth the money.

Street price: $799

Hewlett-Packard

800/752-0900

www.hp.com

READER SERVICE NO. 797

QUICK TAKES

Quick Shot

With most digital cameras, it's impossible to capture a series of pictures without enduring annoying pauses: In many cases, you have to wait 2 seconds between shots. But with Epson's new $699 PhotoPC 700, you can shoot two images at 640 by 480 resolution per second, for up to ten shots, before you have to pause. (That's on par with Nikon's $899 CoolPix 900 and better than Konica's $699 Q-M100.) Based on my experience with a preproduction model, this continuous shoot mode should be particularly useful for live-action photos. The 10-ounce camera can also capture high-resolution images at up to 1280 by 960 pixels. Its 4MB of internal memory stores up to 50 standard (640-by-480-resolution) pictures. Or you can store images on a removable CompactFlash card—like SanDisk's $80 or Lexar Media's $60 4MB CompactFlash cards. Plus, a new Back button lets you erase a photo while it's processing or before it gets stored to memory. The camera and LCD automatically shut off after each picture, saving battery power. A 37mm lens adapter that comes with the camera allows you to attach a wide-angle or telephoto lens. • **Epson; 800/463-7766; www.epson.com**

—*Grace Aquino*

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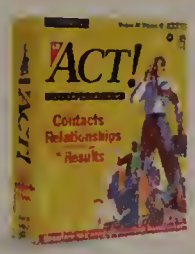

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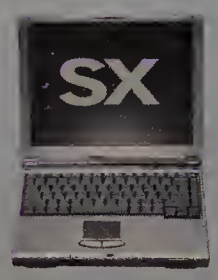

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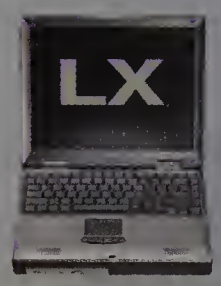

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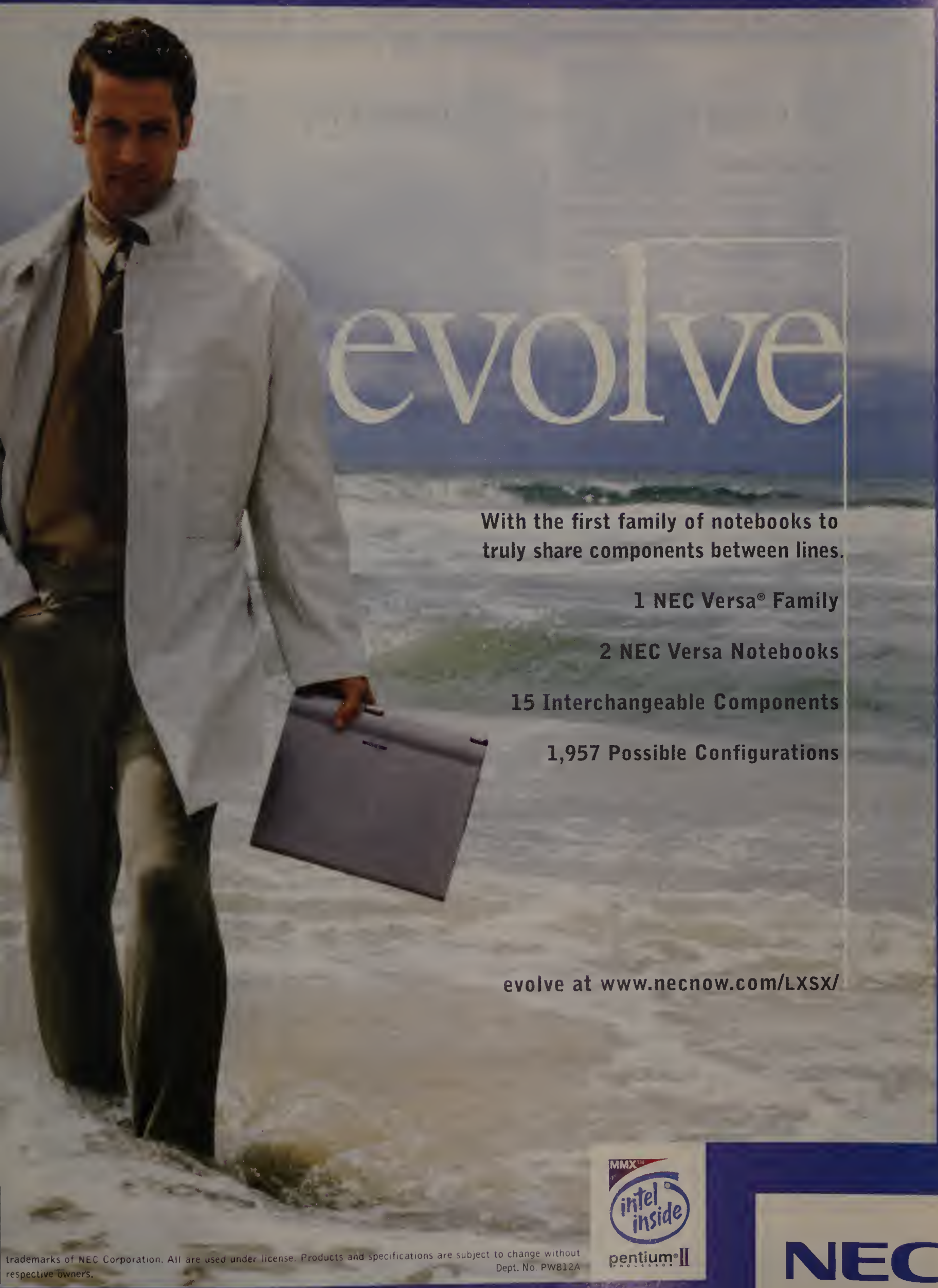

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Circle 158 on reader service card.

Casio's Pilot PDA Imitator Just Doesn't Fly

PDA

MICROSOFT AND computer manufacturers envy the success of 3Com's PalmPilot. Not surprisingly, Microsoft would prefer that PDAs run on some flavor of Windows. Enter Windows CE 2.1—a revamped version of Microsoft's operating system for consumer devices. The new OS was supposed to enable a new wave of Palm-size PCs to rival the Pilot. But the first Windows CE 2.1 PDA I received, a preproduction Casio **Cassiopeia E-10**, was disappointing in my tests. Microsoft and Casio fail to recognize what makes the Pilot successful—simplicity.

The Casio device does resemble the PalmPilot in size (about 3.25 by 5 inches), weight (6.6 ounces), and styling. And like the PalmPilot, the Cassiopeia has an input stylus and dedicated buttons on the front panel for accessing your calendar, memos, and to-do list.

IMPERFECT PDA: The Cassiopeia E-10 suffers from design flaws and gobbles power.

Beyond the superficial similarities, however, lie substantial differences. On the plus side, the Cassiopeia comes with more memory: 4MB of RAM, 8MB of ROM, and a CompactFlash card slot for more memory expansion. Its side panel sports a headphone jack and a button for voice recordings. Though the record button is a nice addition—the PalmPilot doesn't do voice recordings at all—I invariably hit it (and started recording) whenever I took the PDA out of its desktop cradle. And unlike the PalmPilot, the Casio device is a power hog, gobbling its two AAA batteries in about 25 hours (the Pilot typically lasts 25 *days*).

Microsoft has improved on the last version of Windows CE, but this operating system still adds more complexity than I want in a handheld device. Except for its familiar Start button, Windows CE 2.1 is not intuitive.

To synchronize with desktop programs (a procedure done using Windows Explorer), you have to nestle the Palm-size PC in a cradle powered by an AC adapter. If you use Outlook 98, the Cassiopeia lets you synch your personal information manager and e-mail data on a portable device without any third-party software. But while you can synchronize word processing, spreadsheet, and other desktop application files, you won't like their marginal readability on the 240-by-320-resolution screen.

The Cassiopeia E-10 is ultimately not easy to use. You want a Pilot? Then get a Pilot.

—*Michael S. Lasky*

Cassiopeia E-10

PRO: Voice memo capability, easy synching with Outlook 98.

CON: Power hungry, ultimately difficult to use.

VALUE: Complex interface, combined with poor power consumption, dims its value.

Street price: $399

Casio

888/962-2746

www.casio.com

READER SERVICE NO. 716

Iomega Inside: Internal Zip Drive Kit

STORAGE

FOR YEARS, internal versions of the popular Iomega Zip drive have only been available in new systems. To add a Zip drive to your existing PC, you had to buy an external drive that sat on your desk, taking up a parallel port and using a huge power brick that blocked two or three outlets on your surge protector. But Iomega has finally released a $99 **Internal ATAPI Zip Drive Kit**, featuring a 3.5-inch EIDE (ATAPI) drive.

Installing a shipping version of this Zip drive was easy. In fact, anyone who's taken the cover off a PC should be able to do it without much angst. It took me about half an hour. A short installation video (or a bundled CD-ROM) gives safety precautions and shows how things look inside a typical system at each step. Then it shows how to find the correct cables and connectors, and how to ensure you've installed them right-side up.

Included hardware lets you fit the Zip drive into a 3.5- or 5.25-inch externally accessible bay. Iomega also throws in a Y-adapter (in case you don't have an extra power connector) and a data cable with the right connectors to daisy-chain your Zip drive to your CD-ROM drive. Iomega bundles all the necessary drivers, plus some handy utilities (Copy Machine, 1-Step Backup, and Findit disk catalog).

The kit doesn't include any 100MB Zip disks, which cost about $50 for a three-pack or $130 for a ten-pack. Zip disks are expensive compared to some other removable media, like 1GB SparQ disks, which cost $30 each. (An internal version of the SparQ drive kit costs $199.) But Zip drives are far more common, which means your coworkers and friends are more likely to have a drive if you want to swap disks.

—*Rex Farrance* ▶

Internal ATAPI Zip Drive Kit

PRO: Easy to install, affordable.

CON: Zip disks are expensive removable media.

VALUE: Good choice from the market leader.

Street price: $99

Iomega

800/697-8833

www.iomega.com

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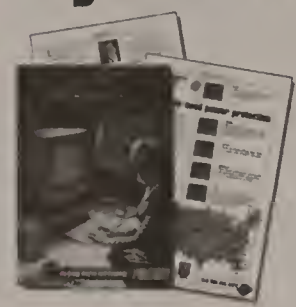

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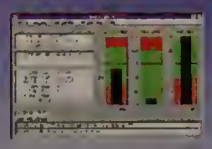

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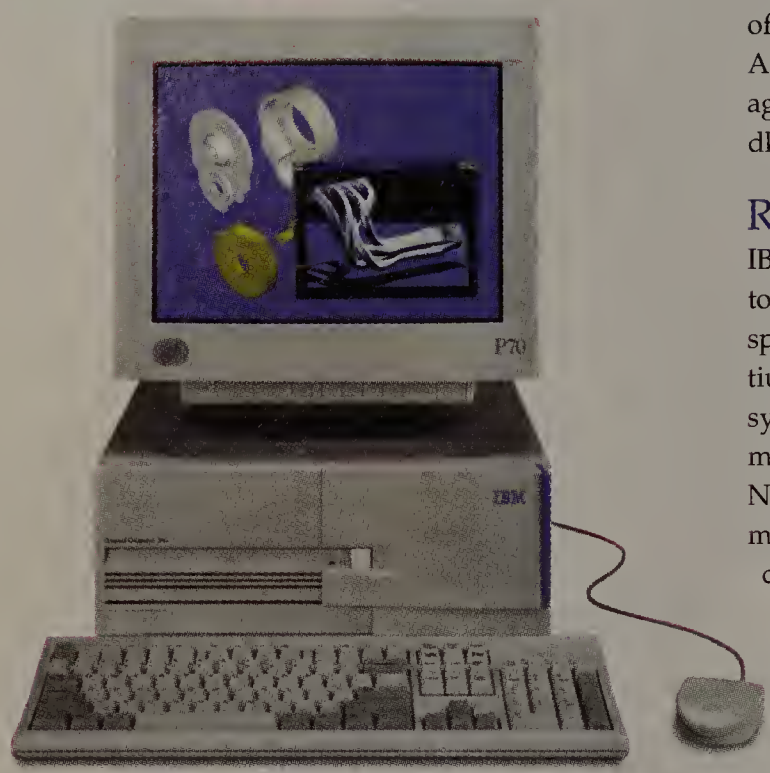

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6561-13U

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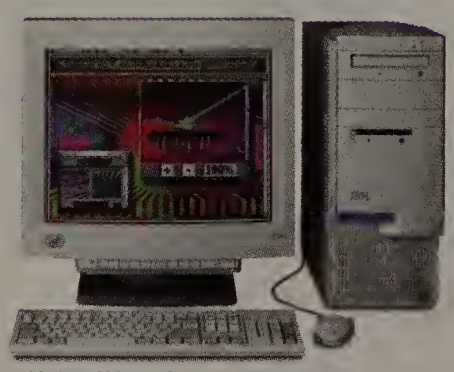

Monitor sold Separately.

PC 300GL-266 Tower

6561-13U

Need room to expand? This is it... Fast, powerful and roomy, this IBM mini-tower has six open slots and 4 open bays.

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Monitor sold Separately.

PC 300GL-266

6561-13U

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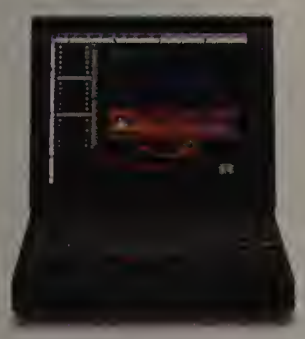

ThinkPad 380ED

2635-5AU

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- 16 MB RAM (80MB max.)
- 2.1 GB SMART EIDE Hard Drive
- 12.1" FRSTN Color Display
- 800 x 600 Resolution
- 1.125MB Video DRAM
- 256KB L2 cache
- 20X CD-ROM
- Lithium-Ion Battery
- 7 Pounds, 2.4" Thick
- Windows 95, Lotus Smart Suite

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Less $200 Factory Mail-In Rebate

$1,199

Your final cost. Rebate ends 6/30/98

ThinkPad 380ED

2635-6AU

This 380ED features IBM's TFT active matrix color display for superior contrast and brightness.

- 166 MHz Intel Pentium® MMX
- 16 MB RAM (80MB max.)
- 3GB SMART EIDE Hard Drive
- 12.1" TFT Active Matrix Display
- 800 x 600 Resolution
- 1.125MB Video DRAM
- 256KB L2 cache
- 20X CD-ROM
- Lithium-Ion Battery
- 7.1 Pounds, 2.4" Thick
- Windows 95, Lotus Smart Suite

$1999
Less $200 Factory Mail-In Rebate

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Your final cost. Rebate ends 6/30/98

ThinkPad 380XD

2635-8AU

When only the best of everything is good enough, the 380XD is the ThinkPad of choice.

- 233 MHz Intel Pentium® MMX
- 32 MB RAM (96MB max.)
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ERoom 2.0: The Easy Way to Collaborate

GROUPWARE

EROOM IS A clever software package for doing collaborative work—sharing documents, conducting threaded discussions, and handling online votes—over the Web. Its name reflects the apt metaphor it uses to organize all this activity: You create an electronic "room" for each project or topic; these rooms store discussions, files, and Web links. The newest version, **ERoom 2.0**, which I tested in beta form, doesn't add a laundry list of features. Instead, it makes existing features work better—an approach I'd like to see more often.

For example, in the past, electronic discussions had to be conducted in text-only format and were limited to one topic. ERoom 2.0 lets you attach documents to discussion entries. Discussions can now have a master topic and multiple subtopics, and all replies to a particular discussion item are indented beneath it.

ERoom 1.0 allowed users to cast electronic votes. But once you cast your ballot, your vote was final. ERoom 2.0 supports multiple rounds of voting.

Finally, ERoom 1.0 included a rudimentary version control system that let you check files out and then back in with comments. ERoom 2.0 indexes the text of the documents automatically, which allows you to search your document library the way you search the Web.

ERoom works only on Web servers running Windows NT (using either Internet Information Server or Peer Web Services). But ERoom 2.0 lets your LAN administrator combine ERoom's name and password security with NT's.

Unfortunately, ERoom 2.0 continues to make heavy use of Microsoft's ActiveX, a technology many corporate intranets don't support.

Still, version 2.0 is well worth the upgrade. Offering the benefits of groupware without the expense and time of implementing Lotus Notes or Microsoft Exchange, ERoom may make you feel right at home.

—Bill Lawrence

ERoom 2.0

PRO: Easy way to share documents, and conduct discussions and votes.
CON: Dependence on ActiveX and NT server a drawback for some firms.
VALUE: Powerful, easy to implement, and reasonably priced.
List price: $129 per user; or $99 per user with 50-user license
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www.instinctive.com
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3D Graphics Tools Have Businesslike Attitude

GRAPHICS

DO YOUR PRESENTATIONS or brochures need sparkle? Both Viewpoint DataLabs' $100 **LiveArt 98** and Template Graphics Software's $49 **LiveWork 3D 1.0** let you embed 3D clip art into Microsoft Office 97 Word and PowerPoint documents. LiveArt also works with Excel documents, whereas LiveWork doesn't. You can easily rotate, crop, zoom, position, turn, toggle, dim, brighten, and color each program's library of 3D clip art images.

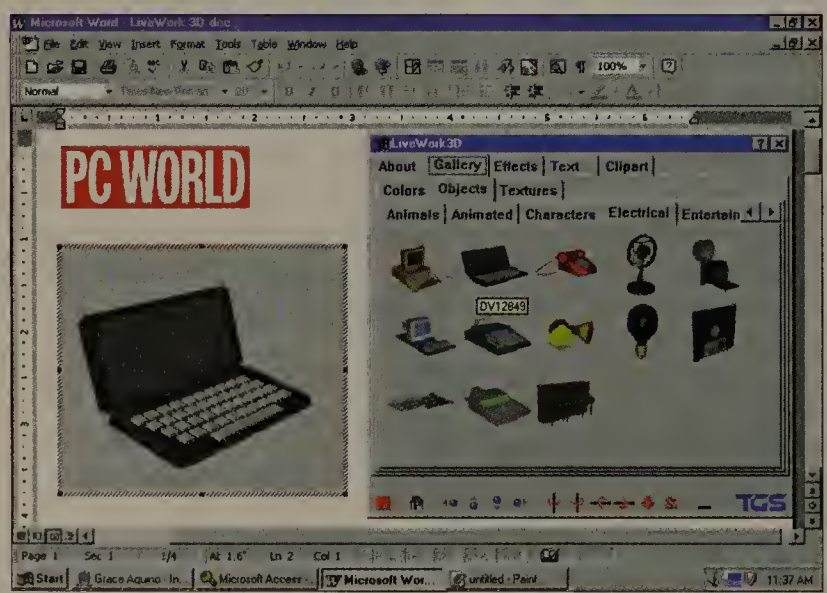
My preproduction copy of LiveArt 98 held an exhaustive catalog of 4000 3D objects, listed as file names, searchable by keyword, and arranged by themes such as nature, architecture, and transportation. LiveArt also offers a variety of artistic style effects, such as pencil sketch, inkwash, pointillism, and cartoon.

But of the two programs, I preferred LiveWork, which I tested in shipping form. LiveWork has a gallery of 400 3D objects, textures, and colors. Thumbnail previews are organized in tabs, and you can drag and drop objects and effects into documents. (LiveArt 98 lacks this capability.)

Though it provides fewer 3D objects, LiveWork offers three more advantages. First, you can apply motion to animate any graphic. Second, you can import 3D models or convert other 2D clip art (in .bmp or .wmf file formats) into 3D. Finally, you can create 3D text.

With both programs, when you send a file, your recipients can open and view the image in 2D, but they'll need a player (downloadable for free) to manipulate 3D images.

—Grace Aquino ▶



YOUR WORK GOES 3D: With LiveWork 3D, you can easily drag and drop graphics effects into MS Word documents.

LiveArt 98

PRO: Extensive, searchable clip art collection; nice artistic effects.
CON: No 3D text or 2D conversion.
VALUE: Somewhat pricey.
Street price: $100
Viewpoint DataLabs
800/328-2738
www.viewpoint.com/liveart
READER SERVICE NO. 719

LiveWork 3D 1.0

PRO: Drag-and-drop functionality, good image-editing options.
CON: Smaller gallery of 3D objects, doesn't work with Excel.
VALUE: Top pick for Office users.
Street price: $49
Template Graphics Software
800/544-4847
www.tgs.com/livework
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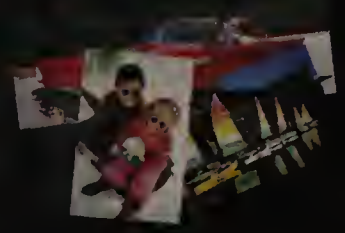

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Circle 135 on reader service card

Top Gun: Dr Solomon's Anti-Virus Deluxe

UTILITY

A NEW VERSION of Dr Solomon's has made me update my antivirus prescription.

In previous *PC World* tests, Dr Solomon's Anti-Virus software always did well at virus detection and removal but fell short on features. Now, with the $60 **Anti-Virus Deluxe** for Windows 95 and NT, Dr Solomon's has surpassed its main competitor, Norton's $50 AntiVirus 4.0. I tested a shipping copy.

Anti-Virus Deluxe does a good job of rooting out known viruses and viruslike behavior. The basic package works continuously in the background, watching for viruses as you access individual files. A new built-in scheduler lets you choose when and how often to perform a complete scan.

Because new viruses appear regularly, updating virus "signature" files is essential. Previously, Dr Solomon's software included a free update for only one month; Deluxe now includes a full year of free updates. The company offers weekly updates of program and signature files via the Internet. Use the program's scheduler to download and install updates automatically.

Deluxe also includes NetGuard, which acts as a virus firewall, isolating downloaded Internet files and e-mail attachments in a protected holding area until they're checked for viruses. Clean files become available immediately; tainted ones undergo the program's disinfection process.

To round out the upgrade, Anti-Virus Deluxe now sports an improved interface that makes customizing easier.

—*Stan Miastkowski*

Dr Solomon's Anti-Virus Deluxe

PRO: New scheduler, free updates.

CON: Slightly higher price than the competition.

VALUE: Top pick, feature-rich, effective.

Street price: $60

Dr Solomon's Software

800/960-9095

www.drsolomon.com

READER SERVICE NO. 721

QUICK TAKES

Watched by an Angel

POWERQUEST'S LATEST set of $49 PC utilities is called **Guardian Angel**, but it's more like a security guard watching everything from sloppy setup programs to office snoops. When you install a new application, Guardian Angel warns you if configuration changes might affect existing programs. And if a new application does cause problems, Guardian Angel helps restore your PC. The program also tracks online activity, notifying you if anything is copied to your hard drive. And if others use your PC, Guardian Angel can hide apps, make Control Panel inaccessible, and protect files and folders from changes. • **PowerQuest**, 800/379-2566, www.powerquest.com.

READER SERVICE NO. 722

—*Stan Miastkowski*

Safe & Sound: Kinder, Gentler Utilities

UTILITY

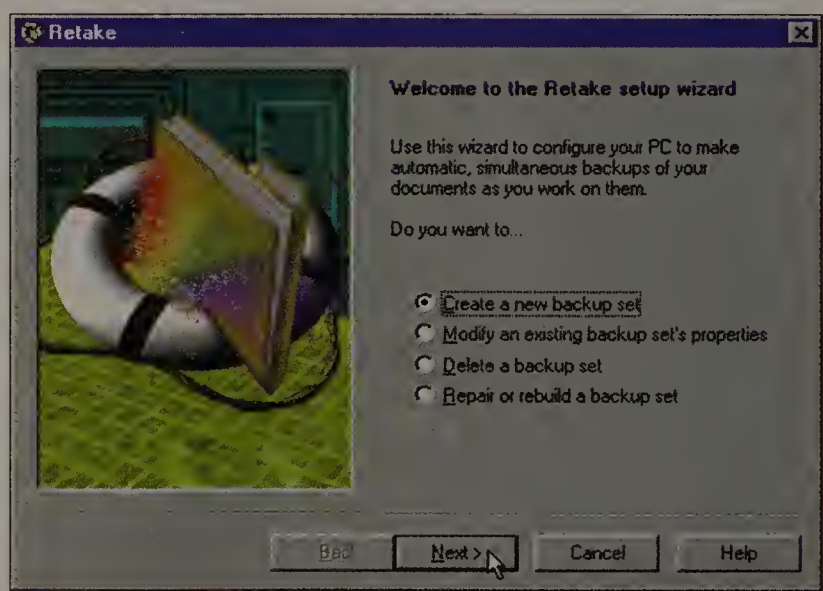
SUITES LIKE Norton Utilities 3.0 ($80) and Nuts & Bolts Deluxe ($59) offer a huge toolchest of PC utilities. But these comprehensive packages are sometimes intrusive and can cause problems, depending on your PC's configuration. **Safe & Sound**, a $29 suite for Windows 95 and 98 from Network Associates, is a safer bet; its tools don't dig too deep into Windows' innards. I tested a shipping version.

Safe & Sound extends Windows 95's built-in utilities, such as ScanDisk and Disk Defragmenter, with tools like PC Checkup, a diagnostic that automatically fixes several common Windows problems. When I ran Checkup, it found some unnecessary .dll files, spotted orphan files I could delete, and identified Windows 95 settings that weren't optimized. Bomb Shelter helps PCs recover from crashes. You also get a rescue disk creation utility, and McAfee ViruScan.

But what really sets Safe & Sound apart is Retake, which automatically and continuously backs up crucial data files (like spreadsheets, documents, or e-mail) to a protected hard disk area or another drive (like a Zip or network drive). However, its use of system resources could slow down older PCs.

Finally, Safe & Sound checks whether your PC is ready for the millennium by changing the clock/calendar and watching the results. The utility then adds a small fix to the autoexec.bat file if necessary.

—*Stan Miastkowski* ▶



FILE LIFESAVER: Safe & Sound's Retake utility continuously backs up important data files to a protected area of your hard disk.

Safe & Sound

PRO: Effective, easy-to-use set of basic add-on utilities.

CON: One utility, Retake, could affect the performance of older PCs.

VALUE: A worthwhile investment.

Street price: $29

Network Associates

408/988-3832

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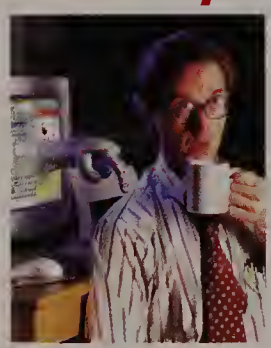

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PC Magazine	**PC World**	**PC World**
Editors' Choice Award QP5/233 M-3 (12/97)	14 Best Buy Awards Oct '97 - May '98	Top 5 Notebooks Quantex H-1330 (05/98) Quantex H-1210 (04/98)
PC Computing	**PC Portables**	**C/Net Online**
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Gateway	80%
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Digital	69%
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Compaq	58%
Packard Bell	51%

Windows Magazine, 8/97

Overall rankings
Technical Support Survey

PC VENDOR	GRADE
Quantex	Excellent
Dell	
IBM	
Compaq	Good
Gateway 2000	
Micron	
Acer	Fair
Toshiba	
Digital	Poor
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Windows Magazine, 8/97

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- 2nd Lithium Ion Battery
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- 32X Max EIDE CD-ROM Drive
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- 104-Key Keyboard with MS IntelliMouse
- MS Windows 95/*FREE* Upgrade to MS Windows 98+
- MS Office '97 Small Business Edition
- 3-year limited warranty with 1-year On-Site Service**
- 24-hr./7-day Technical Support
- DSentry Technology (Including Intel LANDesk Client Manager V 3.1)
- *Upgrade to Windows NT Workstation 4.0 for $99*

QP6/266 SB-2c (w/ Intel® Celeron™ processor). .$1349
QP6/300 SB-2 (w/ Pentium® II Processor). .$1599
QP6/333 SB-2 (w/ Pentium® II Processor). .$1699

QP6/350 SB-3 $1999

Business lease: $70/Mo.

- Pentium® II Processor 350MHz
- 2 Universal Serial Bus (USB) Ports / DMI 2.0
- 64MB SDRAM Memory / 512KB Secondary Cache
- 6.4GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- Intel740™ AGP Graphics with 8MB SDRAM *Upgrade to 3D Labs Permedia 2 w/8MB SGRAM for $49*
- 17" Digital Monitor w/NEC CromaClear CRT (15.9" viewable; .25 dp; 1600x1200 max resolution)
- Choice of Intel Pro 100 Ethernet Controller with Wake-On-LAN+ Technology or K56flex protocol Fax/Modem*
- 32X Max EIDE CD-ROM Drive
- Quantex ATX Mid Tower Case
- 104-Key Keyboard with MS IntelliMouse
- MS Windows NT 4.0 Workstation
- MS Office '97 Small Business Edition
- 3-year limited warranty with 1-year On-Site Service**
- 24-hr./7-day Technical Support
- DSentry Technology (Including Intel LANDesk Client Manager V 3.1)

QP6/300 SB-3 (w/ Pentium® II Processor). .$1749
QP6/333 SB-3 (w/ Pentium® II Processor). .$1849
QP6/400 SB-3 (w/ Pentium® II Processor). .$2199

QP6/400 SB-4 $2499

Business lease: $88/Mo.

- Pentium® II Processor 400MHz
- 2 Universal Serial Bus (USB) Ports / DMI 2.0
- 64MB SDRAM Memory / 512KB Secondary Cache
- 8.4GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- 3D Labs Permedia 2 AGP Graphics Card with 8MB SGRAM
- 19" Digital Monitor (18.1" viewable)
- Choice of Intel Pro 100 Ethernet Controller with Wake-On-LAN+ Technology or K56flex protocol Fax/Modem*
- 32X Max EIDE CD-ROM Drive
- Quantex ATX Mid Tower Case
- 104-Key Keyboard with MS IntelliMouse
- MS Windows NT 4.0 Workstation
- MS Office '97 Small Business Edition
- 3-year limited warranty with 1-year On-Site Service**
- 24-hr./7-day Technical Support
- DSentry Technology (Including Intel LANDesk Client Manager V 3.1)
- *Upgrade to Internal 100MB Zip Drive for $79*

QP6/300 SB-4 (w/ Pentium® II Processor) $1999
QP6/333 SB-4 (w/ Pentium® II Processor) $2099
QP6/350 SB-4 (w/ Pentium® II Processor) $2299

Microsoft Office 97

Small Business Edition includes: Word 97 · Excel 97 · Outlook 97 · Publisher 97 · Small Business Financial Manager 97 · Automap Streets Plus

Business Servers

QX5000 Server $2599
Pentium® II Processor 350MHz

Business lease: $91/Mo.

- Pentium® II Processor 350MHz (Dual-Processor Upgradable)
- 64MB 100MHz ECC SDRAM (1GB Max.) / 512KB L2 ECC Cache
- 32X Max EIDE CD-ROM Drive/3.5" 1.44MB Floppy Drive
- 4GB Ultra-Wide SCSI-3 Hot-Swappable Hard Drive
- Dual Channel Ultra-Wide & Narrow SCSI-3 Controller
- Intel EtherExpress Pro™ 100B Fast Ethernet w/RJ-45
- Server Tower Case w/ 5 Hot-Swap Bays
- I$_2$O -Ready & RAID capable
- Emergency Management Port
- 3-year limited warranty with 1-year On-Site Service**
- 24-hr./7-day Technical Support

QX5000 Server $4099
Pentium® II Processor 400MHz

Business lease: $134/Mo.

- Pentium® II Processor 400MHz (Dual-Processor Upgradable)
- 128MB 100MHz ECC SDRAM Memory
- 9.1GB Ultra-Wide SCSI-3 Hot-Swappable Hard Drive
- MS Windows NT Server 4.0 w/10 Client License

Small Business Server $3999

Business lease: $130/Mo.

- Pentium® II Processor 350MHz (Dual-Processor Upgradable)
- 512KB L2 ECC Cache
- 64MB 100MHz ECC SDRAM Memory (1GB Max.)
- 3.5" 1.44MB Floppy Drive
- 4GB Ultra-Wide SCSI-3 Hard Drive (7200 rpm)
- 15" Digital Monitor (13.8" viewable)
- Dual Channel Ultra-Wide & Narrow SCSI-3 Controller
- 32X Max EIDE CD-ROM Drive
- K56flex protocol Fax/Modem*
- Intel EtherExpress Pro™ 100B Fast Ethernet w/RJ-45
- Server Tower Case
- 104-Key Keyboard with MS Mouse
- Microsoft® BackOffice® Small Business Server Suite
- 3-year limited warranty with 1-year On-Site Service**
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- *Call for additional processor configurations*

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QP5/233 M-1 $1099
Lease: $39/Mo.

- Pentium® Processor with MMX™ Technology 233MHz
- 32MB SDRAM Memory / 512KB Secondary Cache
- 3.2GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- 64-bit 3D Graphics Card with 4MB RDRAM
- 15" Digital Monitor (13.8" viewable)
- K56flex PCI Fax/Modem* w/Voice Mail and Speakerphone
- 32X Max EIDE CD-ROM Drive
- Ensoniq 32-Bit Wavetable Sound Card
- Altec-Lansing ACS-90 Speakers
- Quantex Mid Tower Case
- 104-Key Keyboard with MS Mouse
- MS Windows 95/*FREE* Upgrade to MS Windows 98+
- Value Multimedia Software Bundle
- 3-year limited warranty with 1-year On-Site Service**

QP6/266 M-1c (w/ Intel® Celeron™ processor). $1149
QP6/266 M-1x (with Pentium II processor). $1199
QP6/300 M-1x (with Pentium II processor). $1299

QP6/300 M-2x $1499
Lease: $53/Mo.

- Pentium® II Processor 300MHz
- 32MB SDRAM Memory / 512KB Secondary Cache
- 4.3GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- Toshiba MPACT2 3D Media Accelerator w/4MB RDRAM
- 17" Digital Monitor (15.8" viewable)
- *Upgrade to 17" Monitor w/NEC CromaClear CRT for $99*
- K56flex PCI Fax/Modem* w/Voice Mail and Speakerphone
- 2nd-Generation DVD-ROM Drive w/MPACT2 Decoding
- Ensoniq 32-Bit Wavetable Sound Card
- Altec-Lansing ACS-90 Speakers
- Quantex ATX Mid Tower Case
- 104-Key Keyboard with MS Mouse
- MS Windows 95/*FREE* Upgrade to MS Windows 98+
- Value Multimedia Software Bundle
- 3-year limited warranty with 1-year On-Site Service**

QP6/266 M-2x (with Pentium II processor). $1399
QP6/333 M-2x (with Pentium II processor). $1599
QP6/350 M-2x (with Pentium II processor). $1799

QP6/350 M-3x $1799
Lease: $63/Mo.

- Pentium® II Processor 350MHz
- 64MB SDRAM Memory / 512KB Secondary Cache
- 6.4GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- Intel740™ AGP Graphics with 8MB SDRAM
- 17" Digital Monitor (15.8" viewable)
- *Upgrade to 17" Monitor w/NEC CromaClear CRT for $99*
- K56flex PCI Fax/Modem* w/Voice Mail and Speakerphone
- 32X Max EIDE CD-ROM Drive
- Ensoniq 32-Bit Wavetable Sound Card
- Altec-Lansing ACS-90 Speakers
- Quantex ATX Mid Tower Case
- 104-Key Keyboard with MS Mouse
- MS Windows 95/*FREE* Upgrade to MS Windows 98+
- Value Multimedia Software Bundle
- 3-year limited warranty with 1-year On-Site Service**

QP6/266 M-3x (with Pentium II processor). $1449
QP6/300 M-3x (with Pentium II processor). $1549
QP6/333 M-3x (with Pentium II processor). $1649

QP6/400 M-4x $2349
Lease: $82/Mo.

- Pentium® II Processor 400MHz
- 64MB SDRAM Memory / 512KB Secondary Cache
- 8.4GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- Intel740™ AGP Graphics with 8MB SDRAM
- 19" Digital Monitor (18.1" viewable)
- Internal 100MB Zip Drive with one cartridge
- K56flex PCI Fax/Modem* w/Voice Mail and Speakerphone
- 32X Max EIDE CD-ROM Drive
- Ensoniq 32-Bit Wavetable Sound Card
- Altec-Lansing ACS-90 Speakers
- Quantex ATX Mid Tower Case
- 104-Key Keyboard with MS Mouse
- MS Windows 95/*FREE* Upgrade to MS Windows 98+
- Value Multimedia Software Bundle
- 3-year limited warranty with 1-year On-Site Service**

QP6/300 M-4X (with Pentium II processor). $1899
QP6/333 M-4X (with Pentium II processor). $1999
QP6/350 M-4X (with Pentium II processor). $2149

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QP6/266 SM-1c $1249
Lease: $44/Mo.

- Intel® Celeron™ Processor 266MHz
- 32MB SDRAM Memory
- 4.3GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- Intel740™ AGP Graphics with 8MB SDRAM
- 15" Digital Monitor (13.8" viewable)
- K56flex PCI Fax/Modem* w/Voice Mail and Speakerphone
- 32X Max EIDE CD-ROM Drive
- Ensoniq 32-Bit Wavetable Sound Card
- Altec-Lansing ACS-90 Speakers
- Quantex ATX Mid Tower Case
- 104-Key Keyboard with MS IntelliMouse
- MS Windows 95/*FREE* Upgrade to MS Windows 98+
- Power Multimedia Software Bundle
- Microsoft Office '97 Small Business Edition
- 3-year limited warranty with 1-year On-Site Service**

QP6/300 SM-1x (with Pentium II processor). $1449
QP6/333 SM-1x (with Pentium II processor). $1549
QP6/350 SM-1x (with Pentium II processor). $1699

QP6/300 SM-2x $1749
Lease: $61/Mo.

- Pentium® II Processor 300MHz
- 64MB SDRAM Memory / 512KB Secondary Cache
- 6.4GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- Toshiba MPACT2 3D Media Accelerator w/8MB RDRAM
- 17" Digital Monitor (15.8" viewable)
- *Upgrade to 17" Monitor w/NEC CromaClear CRT for $99*
- K56flex PCI Fax/Modem* w/Voice Mail and Speakerphone
- 2nd-Generation DVD-ROM Drive w/MPACT2 Decoding
- Ensoniq 32-Bit Wavetable Sound Card
- Altec-Lansing ACS-45 Speakers with subwoofer
- Quantex ATX Mid Tower Case
- 104-Key Keyboard with MS IntelliMouse
- MS Windows 95/*FREE* Upgrade to MS Windows 98+
- Power Multimedia Software Bundle
- Microsoft Office '97 Small Business Edition
- 3-year limited warranty with 1-year On-Site Service**

QP6/266 SM-2x (with Pentium II processor). $1649
QP6/333 SM-2x (with Pentium II processor). $1849
QP6/350 SM-2x (with Pentium II processor). $1999

QP6/350 SM-3x $2049
Lease: $72/Mo.

- Pentium® II Processor 350MHz
- 64MB SDRAM Memory / 512KB Secondary Cache
- 8.4GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- Intel740™ AGP Graphics with 8MB SDRAM
- 17" Digital Monitor w/NEC CromaClear CRT (15.9" viewable; .25 dp; 1600x1200 max. resolution)
- Internal 100MB Zip Drive with one cartridge
- K56flex PCI Fax/Modem* w/Voice Mail and Speakerphone
- 32X Max EIDE CD-ROM Drive
- Ensoniq 32-Bit Wavetable Sound Card
- Altec-Lansing ACS-45 Speakers with subwoofer
- Quantex ATX Mid Tower Case
- 104-Key Keyboard with MS IntelliMouse
- MS Windows 95/*FREE* Upgrade to MS Windows 98+
- Power Multimedia Software Bundle
- Microsoft Office '97 Small Business Edition
- 3-year limited warranty with 1-year On-Site Service**

QP6/300 SM-3x (with Pentium II processor). $1799
QP6/333 SM-3x (with Pentium II processor). $1899
QP6/400 SM-3x (with Pentium II processor). $2249

QP6/400 SM-4x $2499
Lease: $88/Mo.

- Pentium® II Processor 400MHz
- 64MB SDRAM Memory / 512KB Secondary Cache
- 11.5GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- Intel740™ AGP Graphics with 8MB SDRAM
- 19" Digital Monitor (18.1" viewable)
- K56flex PCI Fax/Modem* w/Voice Mail and Speakerphone
- 32X Max EIDE CD-ROM Drive
- Ensoniq 32-Bit Wavetable Sound Card
- Altec-Lansing ACS-45 Speakers with subwoofer
- Quantex ATX Mid Tower Case
- 104-Key Keyboard with MS IntelliMouse
- MS Windows 95/*FREE* Upgrade to MS Windows 98+
- Power Multimedia Software Bundle
- Microsoft Office '97 Small Business Edition
- 3-year limited warranty with 1-year On-Site Service**
- *Upgrade to Internal 100MB Zip Drive for $79*

QP6/300 SM-4x (with Pentium II processor). $1999
QP6/333 SM-4x (with Pentium II processor). $2099
QP6/350 SM-4x (with Pentium II processor). $2249

Super Multimedia

QP6/350 M-4x SE $1999
Lease: $70/Mo.

- Pentium® II Processor 350MHz
- 64MB SDRAM Memory / 512KB Secondary Cache
- 6.4GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- Toshiba MPACT2 3D Media Accelerator w/8MB RDRAM
- 17" Digital Monitor w/NEC CromaClear CRT (15.9" viewable; .25 dp; 1600x1200 max. resolution)
- Internal 100MB Zip Drive with one cartridge
- K56flex PCI Fax/Modem* w/Voice Mail and Speakerphone
- 2nd-Generation DVD-ROM Drive w/MPACT2 Decoding
- Ensoniq 32-Bit Wavetable Sound Card
- Altec-Lansing ACS-90 Speakers
- Quantex ATX Mid Tower Case
- 104-Key Keyboard with MS Mouse
- MS Windows 95/*FREE* Upgrade to MS Windows 98+
- Value Multimedia Software Bundle
- 3-year limited warranty with 1-year On-Site Service**

QP6/300 M-4X SE (with Pentium II processor). $1749
QP6/333 M-4X SE (with Pentium II processor). $1849
QP6/400 M-4X SE (with Pentium II processor). $2199

QP6/400 SM-4x SE $2899
Lease: $102/Mo.

- Pentium® II Processor 400MHz
- 128MB SDRAM Memory / 512KB Secondary Cache
- 11.5GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- Intel740™ AGP Graphics with 8MB SDRAM
- 19" Digital Monitor (18.1" viewable)
- Internal 100MB Zip Drive with one cartridge
- K56flex PCI Fax/Modem* w/Voice Mail and Speakerphone
- 2nd-Generation DVD-ROM Drive w/Decoder Board
- Ensoniq 32-Bit Wavetable Sound Card
- Altec-Lansing ACS-490 Speakers with subwoofer
- Quantex ATX Mid Tower Case
- 104-Key Keyboard with MS IntelliMouse
- MS Windows 95/*FREE* Upgrade to MS Windows 98+
- Power Multimedia Software Bundle
- Microsoft Office '97 Small Business Edition
- 3-year limited warranty with 1-year On-Site Service**

QP6/300 SM-4x SE (with Pentium II processor). $2399
QP6/333 SM-4x SE (with Pentium II processor). $2499
QP6/350 SM-4x SE (with Pentium II processor). $2699

Best Buy Specials

M-Series Best Buy $2099
Lease: $74/Mo.

- Pentium® II Processor 350MHz
- 64MB SDRAM Memory / 512KB Secondary Cache
- 6.4GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- Toshiba MPACT2 3D Media Accelerator w/8MB RDRAM
- 19" Digital Monitor (18.1" viewable)
- K56flex PCI Fax/Modem* w/Voice Mail and Speakerphone
- 2nd-Generation DVD-ROM Drive w/MPACT2 Decoding
- Ensoniq 32-Bit Wavetable Sound Card
- Altec-Lansing ACS-90 Speakers
- Quantex ATX Mid Tower Case
- 104-Key Keyboard with MS Mouse
- MS Windows 95/*FREE* Upgrade to MS Windows 98+
- Value Multimedia Software Bundle
- 3-year limited warranty with 1-year On-Site Service**

SM-Series Best Buy $2549
Lease: $89/Mo.

- Pentium® II Processor 400MHz
- 64MB SDRAM Memory / 512KB Secondary Cache
- 8.4GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- Toshiba MPACT2 3D Media Accelerator w/8MB RDRAM
- 19" Digital Monitor (18.1" viewable)
- 100MB Internal Zip Drive with one cartridge
- K56flex PCI Fax/Modem* w/Voice Mail and Speakerphone
- 2nd-Generation DVD-ROM Drive w/MPACT2 Decoding
- Ensoniq 32-Bit Wavetable Sound Card
- Altec-Lansing ACS-45 Speakers with subwoofer
- Quantex ATX Mid Tower Case
- 104-Key Keyboard with MS IntelliMouse
- MS Windows 95/*FREE* Upgrade to MS Windows 98+
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- Microsoft Office '97 Small Business Edition
- 3-year limited warranty with 1-year On-Site Service**

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One Is Not for All: Multifunction Color Printers

PRINTERS

THE NEWEST multifunction ink jets print in living color, so you can finish more tasks—including color copying, scanning, and printing—with one desktop device. I tested shipping versions of top-of-the-line units from Canon and Hewlett-Packard. The verdict: One is not for everyone.

For home-office buyers, the compact $499 Canon MultiPass C5000 includes a 24-bit color sheet-fed scanner, and works as a stand-alone fax machine. For small offices, the somewhat pricey $999 OfficeJet Pro 1175Cse incorporates a more versatile 30-bit color flatbed scanner. It also provides slightly better print quality and a 30-page automatic document feeder.

These all-in-ones are only slightly cheaper than a stand-alone printer, copier, and scanner, but they require significantly less desk space. The 13.2-pound MultiPass takes up only about half as much space as the 36.3-pound OfficeJet.

RIGHT AT HOME: Canon's MultiPass C5000 is affordable and compact. It works as a sheet-fed scanner and a stand-alone fax.

OfficeJet Pro 1175Cse

PRO: High-quality color output, flatbed scanner, 30-page automatic document feeder.

CON: Expensive, slow printing, requires PC modem.

VALUE: Fine quality, but pricey.

Street price: $999

Hewlett-Packard

800/552-8500

www.hp.com

READER SERVICE NO. 728

MultiPass C5000

PRO: Good-quality color output, built-in fax capability, good price.

CON: Sheet-fed scanner is limited to single pages.

VALUE: Bargain price, well suited to home offices.

Street price: $499

Canon Computer Systems

800/652-2666

www.ccsi.canon.com

READER SERVICE NO. 729

UNHURRIED PRINTING

AS PRINTERS GO, neither unit was very fast. In my best-quality–monochrome tests, the Canon printed 3 pages per minute and the HP 2 ppm. Canon would not give a rated speed for best-quality text; HP quotes 4 ppm.

In fast mode (draft quality), the Canon and HP printed 3.5 and 6 ppm, respectively, compared to their rated speeds of 5 and 9 ppm. For its price, the HP is too slow to be the sole printer in many small offices.

The HP offers 600-by-600-dpi color resolution, superior to the Canon's 720 by 360 dpi. In my tests using presentation and newsletter pages with about 50 percent color coverage, both printers approached their respective rated speeds of 2 ppm and 1 ppm for best quality. Photos take longer.

Both produced good-looking results, but I preferred the HP OfficeJet Pro's color output.

OH BOY, COLOR COPIES

FEW OF US already have a color copier sitting around at home. You can use either unit's front LCD panel to make color or monochrome copies, whether the PC is on or not. HP's flatbed-based color copier allowed me to copy objects (like a product box) or bound books, and reduce or enlarge originals from 25 to 400 percent. The Canon copies only single sheets; it can reduce them to as little as 70 percent, but you must use the bundled software to enlarge them. In my day-to-day use, the HP was a better walk-up copy machine: Its front panel just offers more.

SMALL-OFFICE SET: HP's OfficeJet Pro 1175Cse has good features but is expensive.

The Canon can be hooked up to a telephone line to act as a stand-alone fax machine for sending and receiving. It also works with your PC's modem. The HP works only with your PC's modem.

The Canon offers a superior software bundle that includes two document management options: Canon's simple MultiPass Desktop Manager 2.5, with easy access to scanning, faxing, and an address book; and Xerox's more advanced Pagis for MultiPass version 1.0, for capturing, editing, organizing, sending, storing, and retrieving documents. You also get Canon Creative, a great package for making cards, banners, and labels; and TextBridge Classic version 1.07 OCR, which converts scanned documents into editable text.

The HP comes with the OfficeJet Pro PictureScan Task Manager, for scanning and preparing documents for faxing, and for optical character recognition; Symantec WinFax Pro (version 8.02), to use with your PC-based modem; the image editing program Adobe PhotoDeluxe 2.0; and Caere's OmniPage Limited Edition 5.0 OCR application.

If the HP cost a bit less, it'd be easy for anyone to like. The Canon, meanwhile, is priced just right for home offices.

—*Richard Jantz* ▶

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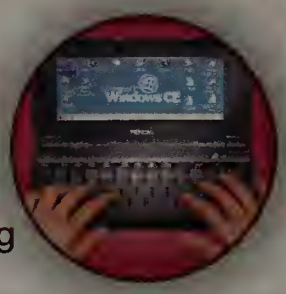
With its geometrically flat screen, it eliminates distortion and reduces glare up to 25% over conventional flat square screens. Or our high-speed, high-capacity **CD-ROM and DVD-ROM drives.** Or our more powerful, more portable **Phenom Handheld PCs.**



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HNOLOGY

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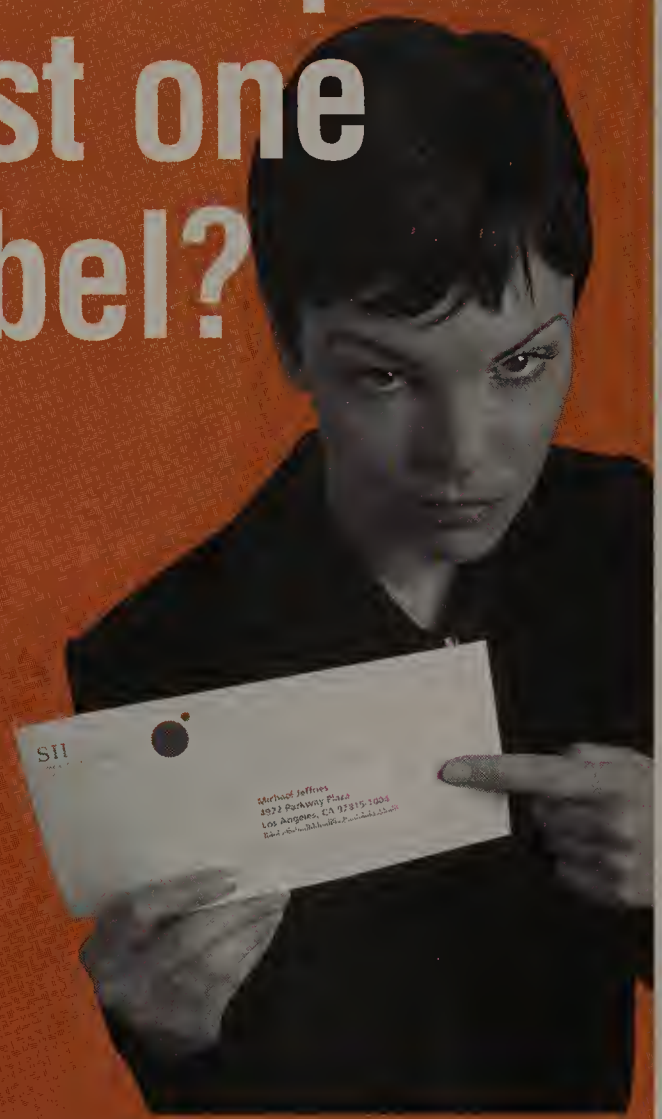
I'm sending one letter, can't I print just one label?



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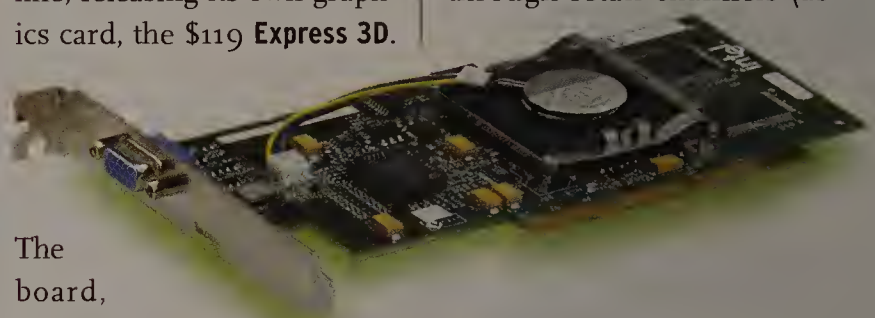
Circle 218 on reader service card

Intel's Express 3D: Low Cost, Average Speed

GRAPHICS

IT'S NO SECRET that Intel's favorite topic these days is graphics. First it introduced the Accelerated Graphics Port bus, then the speedy i740 accelerator chip for 2X AGP graphics cards. Now Intel has put its brand name on the line, releasing its own graphics card, the $119 **Express 3D**.



The board, which uses the i740, is no slowpoke, but it's not the fastest of its kind either.

The shipping version of the Express 3D card that I tested, with 4MB of SGRAM, proved to be a little humdrum for 2D graphics and video. But its 3D games performance raised eyebrows in the test center: Compared to other AGP cards that don't use the i740 chip, the Express 3D ran a full 30 percent faster. Image quality was pretty impressive, too.

Of course, when playing games like Quake II, you'll need to adjust the brightness of your monitor to obtain the best results.

Although Express 3D is a quick performer, it doesn't exploit the i740's full potential. In *PC World* tests, Real3D's Starfighter AGP board provided better overall performance. However, you pay a bit more for the gain in performance: With 8MB of SGRAM, Starfighter has a street price of $149. Other i740 graphics boards expected to hit retail shelves soon should also run faster, for about the same price as the Express 3D.

Another drawback to Intel's new board is that Intel is selling Express 3D through resellers and dealers, instead of through retail channels (as Starfighter is sold). Because Intel will only provide technical help to its dealers, you'll have to call the dealer if you want any support.

Still, the Express 3D is a powerful board, thanks to its i740 accelerator chip. And if price is one of your main buying concerns, $119 is quite reasonable for what you get. But taking into account the indirect tech support situation and the fact that the board's overall performance lags slightly behind other i740-based graphics boards I've tested, it's not the best of its kind either.

—*JoAnne Robb* ▶

Intel Express 3D

PRO: Fast in 3D games.

CON: Only average 2D performance, getting support could be tricky.

VALUE: Low cost, performed slower than other i740-based cards.

Street price: $119

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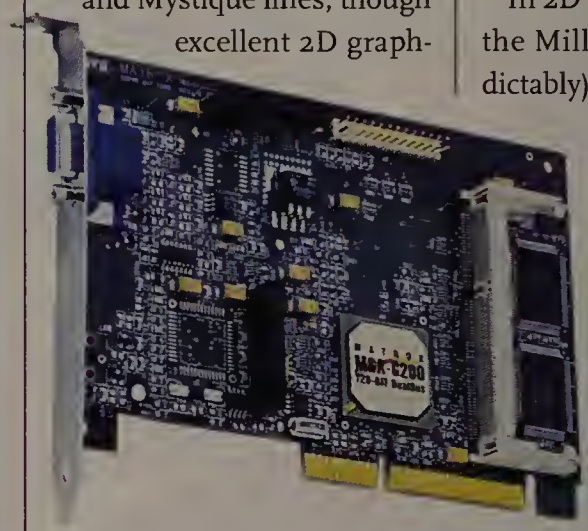
Matrox's New Millennium

GRAPHICS

I WAS SKEPTICAL about the new **Matrox Millennium G200** graphics board. The company's previous Millennium II and Mystique lines, though excellent 2D graphics boards, had skimped on 3D quality in favor of raw speed. But my tests of a beta version of the Millennium G200 suggest that Matrox has caught up with—and maybe surpassed—the 3D board makers.



SMART MOVE: Matrox's Millennium G200 aces 2D and speeds through 3D games.

Based on the new 128-bit MGA-G200 accelerator chip, the Millennium G200 incorporates 3D functions that were absent from its predecessor, like bilinear and trilinear filtering. The G200 also has a triangle setup engine to relieve the CPU, and can run games in 24-bit true color.

In the lab's subjective 3D tests, the Millennium G200 gave the new Intel Express 3D board a serious run for its money, outdistancing Express 3D in some games. Unfortunately, I didn't get a clear picture of its performance with either Quake II (because Matrox hadn't finished its OpenGL driver) or Caligari TrueSpace (due to a known bug). But if the firm's past production standards are any indication, Matrox will have its drivers in tip-top shape when the card hits the stores.

In 2D and multimedia tests, the Millennium G200 (predictably) ranked at or near the head of the class. It's an AGP 2X card with the latest Advanced Graphics Port features to rev up programs that need it. It'll help you make the most of the newest games and give you some investment protection.

But what you may like best about the G200 is its price. Instead of costly WRAM, Matrox put 8MB of SGRAM (upgradable to 16MB) onto the board, which will sell for just $169. The board's price, speed, and 3D quality—plus Matrox's reputation for solid, reliable products—make it a smart choice. Matrox is positioning the Millennium G200 as an affordable board for business customers; but at this price, small-office/home-office customers would do well to consider it for a graphics upgrade.

—*Brad Grimes* ▶

Matrox Millennium G200

PRO: Good value for the price, solid 3D graphics quality.

CON: None significant, if driver issues are resolved by ship time.

VALUE: Worthy, affordable choice.

Street price: $169

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800/361-1408

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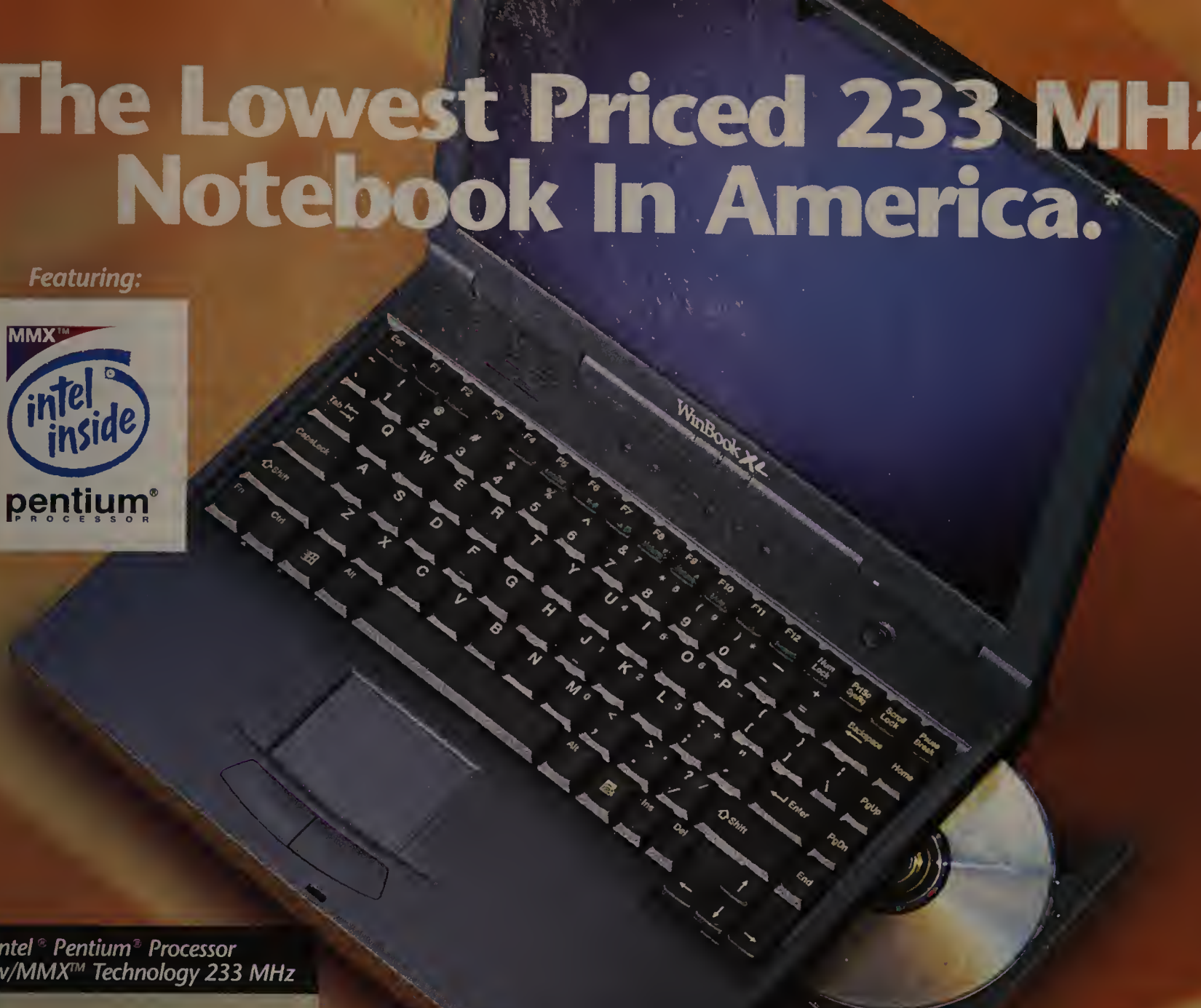

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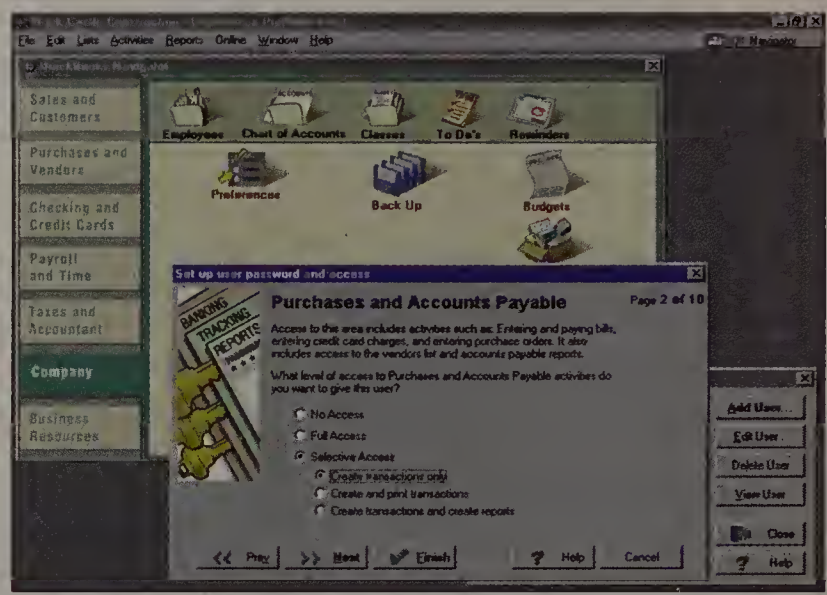
Intuit & Peachtree: Newest for Small Business

ACCOUNTING

DON'T HIT your books just yet: Intuit and Peachtree have come out with more flexible accounting packages for your small business. I examined beta versions of **QuickBooks Pro 6.0,** Intuit's first multiuser version, and Peachtree Office Accounting, which makes importing and exporting in Word and Excel formats easy.

QuickBooks has long been popular among small businesses, but it hasn't (until now) simplified data-sharing among employees. QuickBooks Pro 6.0 lets up to five users access accounting data over a network simultaneously, given that each has a copy of the program. Only one person can change a particular piece of information, such as an invoice, at any one time, though others can view it.



FOR THE GANG: QuickBooks Pro 6.0 is the first multiuser version from Intuit, with wizards to help you establish security.

The setup wizard assigns each user a security clearance—to prevent, for example, peeking at payroll records. QuickBooks Pro 6.0 also has time and billing, estimating, and job-costing features.

Both the $219 QuickBooks Pro 6.0 and its $119 sibling, QuickBooks 6.0, link to useful Internet resources, such as tools for finding the best loans and credit.

QuickBooks remains easy to use. New multimedia videos explain the numerous accounting procedures. Some people like the more structured approach of BestWare's MYOB Premiere Accounting. But if you already use QuickBooks or Quicken, QuickBooks Pro 6.0 is hard to beat.

THE OFFICE PEACHTREE

PEACHTREE'S **Office Accounting** program lets you import and export Microsoft Office information easily in Excel and Word formats. (Another bookkeeping program, CA's Simply Accounting Version 6, tries something similar but isn't as easy to use.)

You navigate Peachtree Office Accounting using flowcharts that show the processing path for functions such as receivables and payables. The program resembles the excellent command center in BestWare's MYOB package, except Peachtree offers an improvement: a built-in version of MS Internet Explorer to provide access to Web links.

Instead of printing, you can place financial reports in MS Exchange or MS Outlook folders, but only one employee on the network can view them at a time.

—*Richard Morochove* ■

OFFICE HELP: Peachtree Office Accounting works with MS Office files. Flowcharts help you navigate through tasks.

QuickBooks Pro 6.0

PRO: First multiuser version of popular package.

CON: Interface is somewhat unstructured.

VALUE: Easy choice for Quicken or QuickBooks users.

Street price: $219; $599 for a five-user package; rebates range from $30 to $100 for current users of Quicken or QuickBooks

Intuit

800/446-8848

www.quickbooks.com

Peachtree Office Accounting

PRO: Imports and exports easily with MS Office.

CON: No multiuser version yet.

VALUE: Good choice for those fond of MS Office.

Street price: $149

Peachtree Software

800/428-6957

www.peachtree.com/office

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QUICK TAKES

Networking With USB

IT USED TO BE that some small-office PC users would grimace at the word *network*. If you dread complicated software and add-in boards, Anchor Chips $79 **EZ Link Instant Network,** a USB cable, might make sense. Although this product wasn't ready for testing at press time, it looked promising. The cable plugs between two PCs, or a PC and a peripheral that you want your office to share. Exploiting the Universal Serial Bus port found on most new systems, EZ Link requires a one-time software driver installation and supports up to 16 PCs or devices, according to the company. It's also Plug and Play and will allow you to hot-swap devices on your mininetwork without rebooting, the vendor says. Each cable costs $79 and you'll need one for each pair of devices you want to connect.

• **Anchor Chips;** 619/613-7907; www.ezlinkusb.com

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—*Michael S. Lasky*

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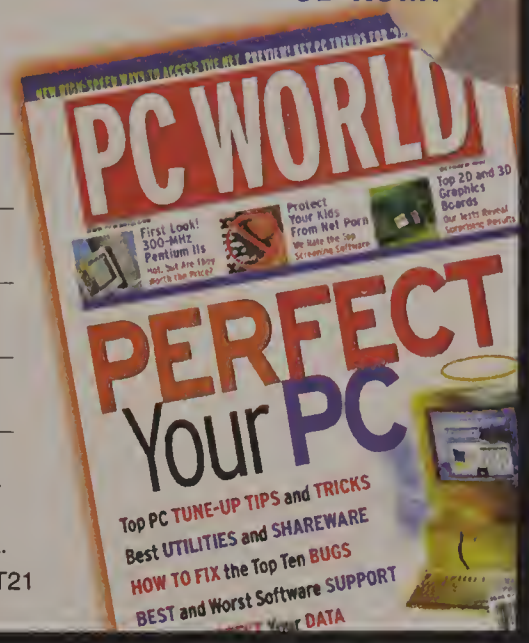

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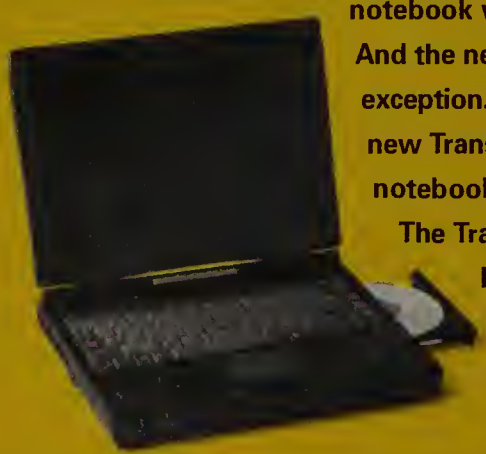

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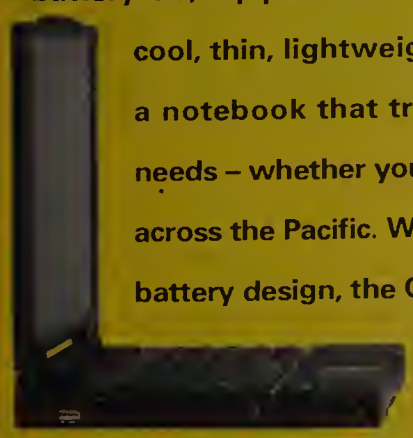

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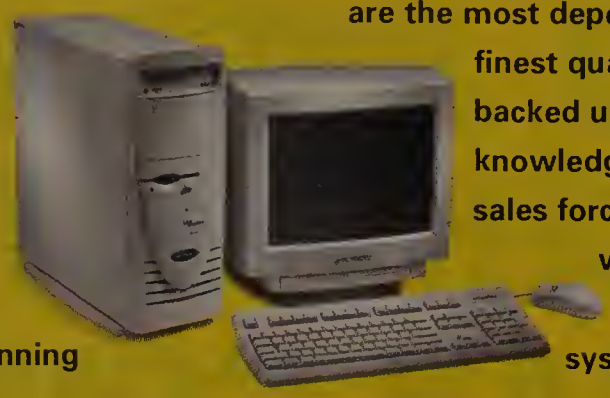

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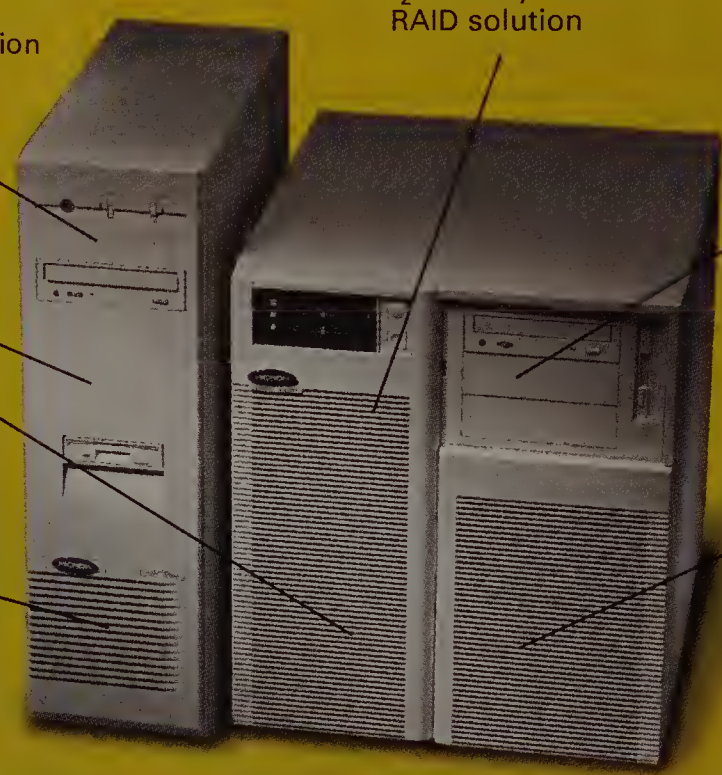

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BY SCOTT SPANBAUER

ILLUSTRATIONS BY PHILIP ANDERSON

WINDOWS 98 NOW... Or Never?

A thousand little improvements and fixes make this a better version of Windows 95. But should you wait for NT 5.0?

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AFTER MONTHS of waiting, an endless cycle of beta versions and "release candidates," ongoing legal wrangling, and inescapable hype, it all boils down to a simple question: Does upgrading to Windows 98 make sense?

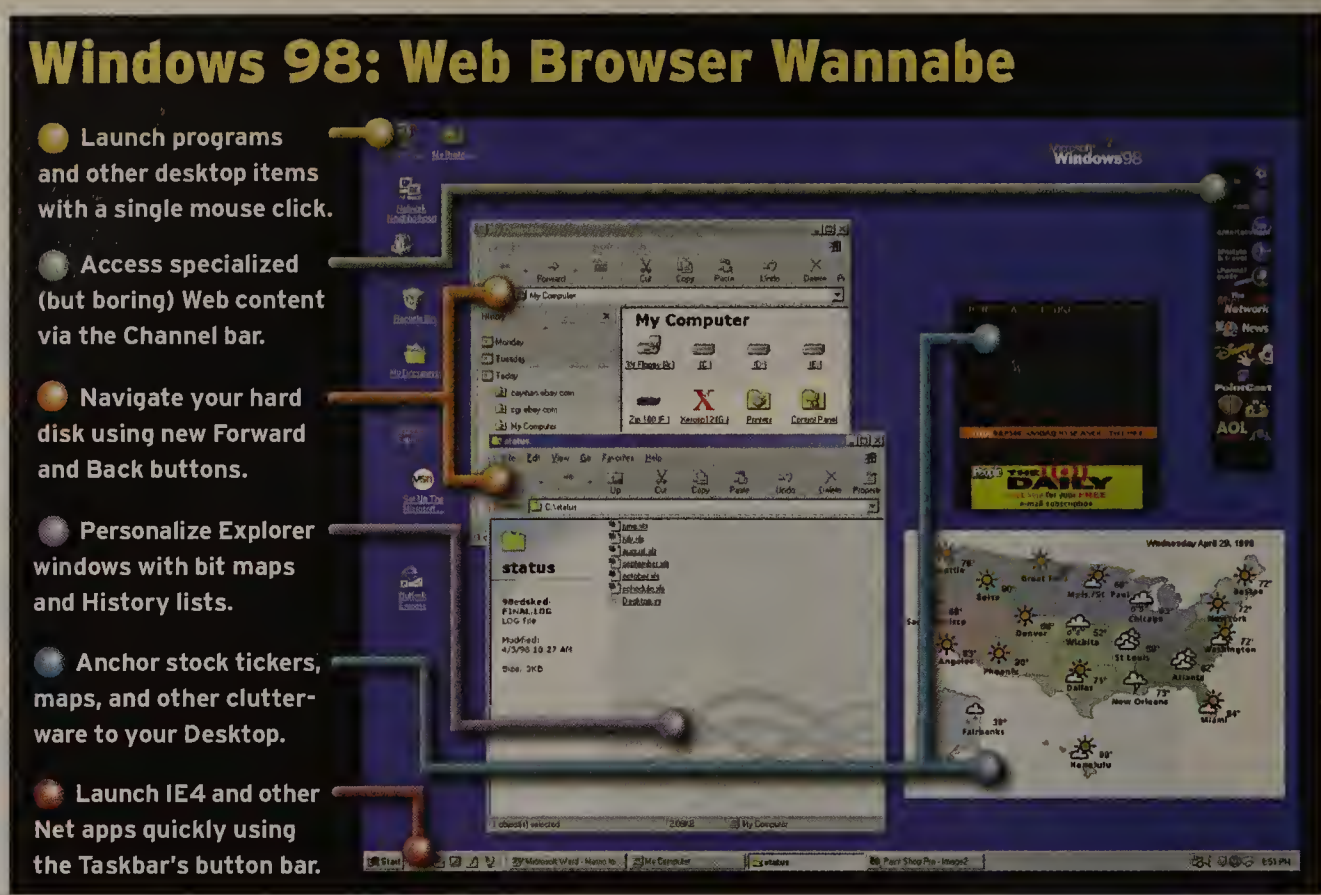
The question may be simple, but it's not easy to answer. If Windows 95 was a great leap forward, Win 98 is a series of baby steps. No single feature of this $90 (street price) upgrade screams "buy me," and many improvements are available as free downloads or in recent Win 95 versions.

Ultimately, the new operating system's fate will be decided in court (see our story on page 59; for updates, consult www.pcworld.com/microsoftnews). Moreover, industrial-strength Windows NT 5.0 waits in the wings. It will incorporate most of Win 98's new features and should be more secure, stable, and manageable. With NT 5.0 due early next year, many users (especially corporate types) may wait before upgrading (see "Next Stop, NT 5.0?"). ▶

98
Outlook
Complete Dell Setup
Corel WordPerfect
nce Wizard
The programs listed below op
Windows starts.
To start Windows more quickly
each program you do not want
Iomega Startup Options
Iomega Watch
Zip Disk Icons
Windows98
Register Now
Connect to the Internet
Discover Windows 98
Maintain Your Computer
news &
technology
sports

To determine whether Windows 98 is really safe for human consumption, *PC World*'s crack editorial testing team spent countless hours installing and using the latest release candidates on a range of PCs, from 66-MHz 486 systems to 300-MHz Pentium IIs. The version we tested was very close to final code, though it didn't have every last tweak in place. Still, our informal testing shows the new operating system to be about as fast and at least as stable overall as Windows 95 (next month we'll publish final test results based on shipping code of the new operating system). Our conclusion: Windows 98 improves on its predecessor in ways that many users will appreciate. But it's not for everyone.

Windows 98: Web Browser Wannabe



FIGHT OR SWITCH?

MANY PC USERS OWN parts of Windows 98 already. Since Windows 95's debut, Microsoft has released a steady dribble of updates, plus new releases preinstalled on new PCs (called OSRs, or OEM service releases). All have been integrated into Win 98.

Any PC purchased within the last 18 months probably came with Windows 95 OSR 2. This version includes the FAT32 file system, which can free up hundreds of megabytes of wasted hard disk space. (To identify the version of Windows you own, open the *Control Panel*, launch the *System* applet, and click the *General* tab. If you see version 4.00.950 listed, you have the original release of Windows 95. If you see 4.00.950 B, you have OSR 2 or later.) The more recent OSR 2.1 adds limited support for Universal Serial Bus peripherals; most new PCs shipped this year use OSR 2.5, which includes Internet Explorer 4.0. Other updates that found their way into Windows 98, such as improved Dial-Up Networking, are free for the downloading from Microsoft's Web site.

Should you move to Windows 98? It depends on what version of Windows you're now using, and whether you're upgrading one machine or a hundred. Odds are, you fall into one of these four camps:

Recent PC buyers. If you bought a system in the past six months, you own many of Windows 98's innovations (you lack enhanced support for new hardware devices and a raft of troubleshooting utilities). If you plan to add a USB scanner or a DVD-ROM drive, upgrading makes sense. If not, and you're happy with Windows 95's stability and performance, you probably shouldn't bother.

Windows 95 veterans. People with older versions of Windows 95 have the most to gain from an upgrade. Windows 98 collects nearly three years of bug fixes on a single CD-ROM. That's a lot more appealing than downloading a multitude of patches—especially if you have to do it for more than one machine.

Should You Upgrade to Win 98?

IT MAKES A LOT of sense in some situations, but little in others.

Yes

Your Situation:

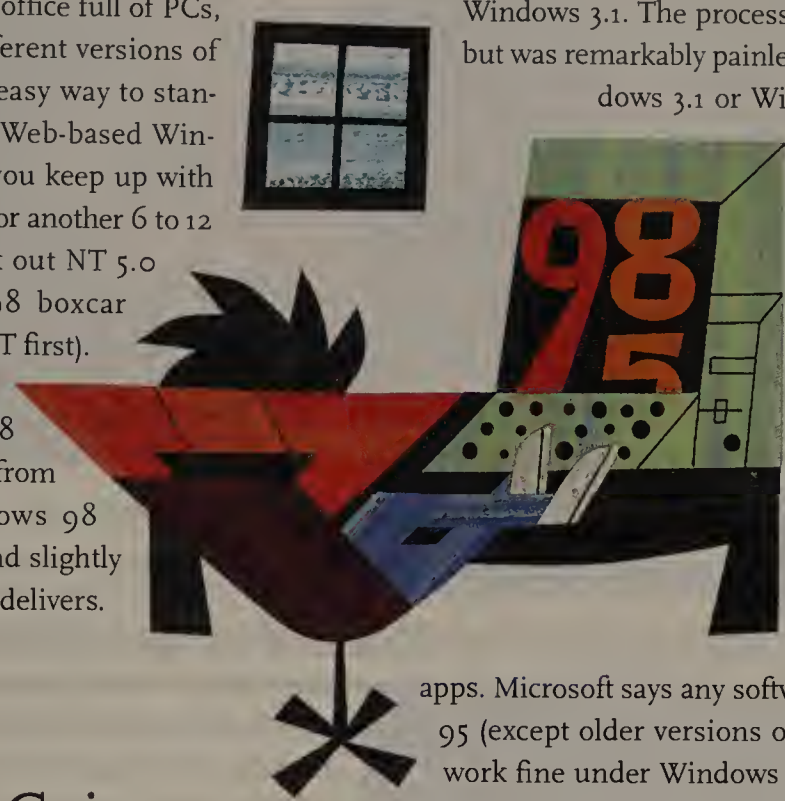
- ← SPENDING $90 seems worth it to get a CD-ROM with the latest version of every Windows feature, patch, and bug fix.
- ← YOU HAVE the original version of Windows 95, and you want a more stable version of Internet Explorer 4.0.
- ← YOU PLAN to add USB devices, a DVD-ROM drive, or other cutting-edge peripherals.
- ← YOU HAVE the original version of Windows 95 and want the more efficient FAT32 file system.
- ← WINDOWS 95 crashes too much.
- ← YOU HAVE Windows 95 OSR 2 and Internet Explorer 4.0, but you'd like more tools to help your PC run smoothly.
- ← $90 SEEMS like a lot of money for a modest operating system upgrade.
- ← YOU HAVE a strong distaste for Internet Explorer 4.0.
- ← YOUR COMPANY is considering moving everybody to NT 5.0 next year, and you don't want to upgrade twice in 12 months.
- ← YOU DON'T have (at a bare minimum) a 66-MHz 486 PC with 16MB of RAM and 170MB or more of disk space.

No

Windows 3.1 diehards. Still clinging to Windows 3.1? Now might be the time to let go—if your hardware is up to snuff. Microsoft recommends at least a 66-MHz 486 system with 16MB of RAM and around 170MB of disk space. That configuration will work, but we recommend no less than a P-90 with 32MB.

Corporate climbers. If you have an office full of PCs, they probably all sport slightly different versions of Windows. Windows 98 offers an easy way to standardize your OS, and Microsoft's Web-based Windows Update service should help you keep up with future fixes. But if you can hold off for another 6 to 12 months, you might want to check out NT 5.0 before hopping the Windows 98 boxcar (unless the feds manage to derail NT first).

Finally, if you buy a new system, it's likely to come with Windows 98 preinstalled. And that's okay. Aside from better hardware support, Windows 98 promises smoother Web surfing and slightly better performance—and mostly, it delivers.



Installation:
Less Pain, More Gain

MANY USERS FOUND upgrading from Windows 3.1 to Windows 95 a nightmare. Well, we're happy to report that installing Windows 98 over Win 95 is far simpler. The setup program asks you a few questions, gets you to accept the license agreement and enter a cryptic code, and then completes the rest of the installation—you can go to lunch. The total installation time ranged from 30 minutes or so on a 300-MHz Pentium II with 64MB of RAM to over an hour on older systems.

But installation wasn't entirely a cakewalk. Systems low on disk space experienced difficulties, even when our beta testers set aside more free space than the installation program asked for. On two different computers, both with about 100MB of free disk space, Windows 98's setup failed due to insufficient space.

Lesson learned: Though the exact amount of free space required depends on your PC's configuration and the options you choose, make sure you have at least 150MB of free space before attempting to install the new OS (170MB if you're moving from Windows 3.1). After you upgrade to Win 98, your operating system consumes about 300MB of disk space, if you choose every component and retain the option of uninstalling it. In our tests, uninstalling effectively restored the system to its previous state.

We also installed the new OS on a 486-66 machine running Windows 3.1. The process took a hair over 90 minutes but was remarkably painless. And installing it over Windows 3.1 or Windows 95 lets you decline to install some elements, saving valuable disk space.

One warning: After we installed the prerelease version of Windows 98, we encountered problems with some peripherals and drivers that had worked fine in Windows 95; see "Hardware Support: Good News, Bad News" for details. Still, we didn't have to reinstall any software or buy new apps. Microsoft says any software that ran under Windows 95 (except older versions of some disk utilities) should work fine under Windows 98. In our tests, major business programs ran problem-free. But some utilities, such as Nuts & Bolts' Registry Wizard and Wilson WindowWare's WinBatch, don't function fully under the new OS.

Interface:
The Desktop Meets the Web

IF WINDOWS 98'S interface looks suspiciously familiar, then you're probably already using Internet Explorer 4.0. Windows 98's slick new menus, enhanced Taskbar, browserlike buttons, and customizable folder views are all part of IE4's drably named Desktop Update feature (not to be confused with Windows Update; see "Housekeeping: Keeping Win 98 Alive").

Windows 98's Webified look is also highly customizable. You can adopt the features you like and shun the ones you hate. Though you can bolt all of these things onto Windows 95 by installing Internet Explorer 4.0, upgrading to Win 98 is easier. Judging from our experience, it yields a more stable system, too.

TWO CLICKS, OR ONE?

WINDOWS 98'S MOST obvious innovation (also found in IE4) is the ability to open files and launch applications with a single mouse click. You can adopt the new Web-style interface, the classic Windows 95 arrange- ▶

Windows 98 at a Glance: Interface

Feature	First appeared in...	What does it do?	Verdict
Single-click program launching	Internet Explorer 4.0	Web-like launching of apps, faster and easier than double-clicking.	👍
Browser-style file management	Internet Explorer 4.0	Forward and Back buttons and other browserlike features ease navigation of local disks and servers.	👍
Customizable Taskbar	Internet Explorer 4.0	Adds multiple toolbars to the Taskbar for quick application launching.	👍
Active Desktop	Internet Explorer 4.0	Clutters the desktop with snippets of Web pages, bogs down your PC.	👎

Beta Testers Speak Out

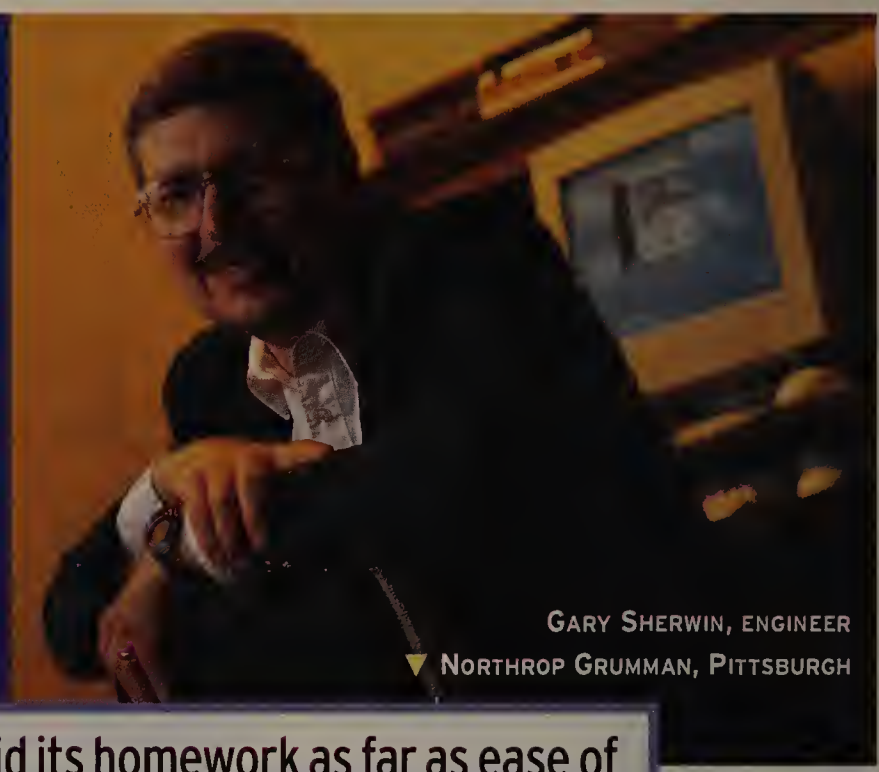
MICROSOFT'S LATEST upgrade draws bouquets and brickbats.

"In general, Windows 98 is a vast improvement over Windows 95—faster, much more stable, and with decent support for standards like Universal Serial Bus."
JIM MITCHELL, SYSTEMS ANALYST
SEATTLE

"I'm really pleased with Windows 98 overall, but I wish it had voice recognition built in. I think people would be happier with computers if they didn't have to type as much."
LESLIE FREELAND
STUDENT, SACRAMENTO, CA

"If I had to pick one thing I don't like about Windows 98, I guess it would be Windows Update. The active setup that Microsoft uses now makes it difficult to update more than one machine [at a time]."
RICHARD HAY, U.S. NAVY COUNSELING CENTER, NAPLES, ITALY

"Personally, I like having two-and-a-half years' worth of bug fixes, patches, and additional features on one CD-ROM. I reinstall Windows on my computers two or three times a year, so it's a big hassle applying all the patches and upgrades every time."
JAY BARKER, STUDENT
TACOMA, WA



GARY SHERWIN, ENGINEER
▼ NORTHROP GRUMMAN, PITTSBURGH

"Microsoft really did its homework as far as ease of maintenance goes. The Update Wizard and Registry Checker are exactly

ment (in which a single click selects an object and a double click opens it), or a customized mixture of the two.

Another big change: Windows Explorer (the file manager) looks and acts a lot like Internet Explorer (the browser). The Forward and Back buttons on the Windows Explorer toolbar make it easier to move back and forth between, say, a folder at the top of drive C: and a file in the middle of E:. Type a URL into the address window, and your Explorer window turns into IE4—an efficient way to jump to a Web page. The left pane of the Explorer window can hold a traditional file tree or display elements of IE4, such as your list of favorite Web sites. And instead of having a blank background for each folder, you can display an image or an HTML file that describes its contents.

A beefier Taskbar is another useful IE4 innovation conscripted into Windows 98. Besides the usual buttons for jumping between running applications, you can add customizable icon toolbars; these let you launch apps or load documents without rummaging through the Start menu.

Active Desktop, yet another IE4 alumnus, turns Windows' backdrop into a placeholder for snippets of Web content such as stock tickers and weather maps. But add enough of these applets and your screen will mutate into a blinking digital Christmas tree. Despite all the flash, the content itself is largely static: To see updated ticker, weather, or news data, you need to be connected to the Internet. Our consensus? Active Desktop is slow, clutters up the Windows desktop, and doesn't do anything you couldn't easily do with a browser. Fortunately, you can turn off Active Desktop with a few clicks.

Internet:
Mo' Better Browsing

BROWSING THE WEB is no longer a fad, it's a necessity. No wonder Windows 98 is a much more "connected" operating system than Windows 95 ever was. Besides integrating Internet Explorer 4.0, Win 98 adds several technologies that make Net

Windows 98 at a Glance: Internet

Feature	First appeared in...	What does it do?	Verdict
Integrated Web browser	Internet Explorer 4.0	Makes IE4 more stable than when running under Windows 95.	👍
Channels	Internet Explorer 4.0	Pushes selected Web pages to your desktop, but more annoying than useful overall.	👎
Outlook Express	Internet Explorer 4.0	Handles e-mail chores with ease.	👍
RSVP	Windows 98	Reserves Net bandwidth for gaming and other purposes; sounds promising, but not here yet.	?
Virtual Private Networking	Dial-Up Networking 1.2	Log on to a LAN securely over the Internet; much cheaper than using leased lines.	👍

PHOTOGRAPH: DAVID ASCHKENAS / SABA

connections more secure and may make them more reliable.

Fully integrating Internet Explorer 4.0 into Windows 98 seems to have improved IE4's reliability: In our tests, the browser crashed less often than when used in conjunction with Windows 95. That's lucky because—while Win 98 doesn't prevent you from using Netscape Navigator—you can't uninstall IE4.

CLEAR THE CHANNELS

ONE PIECE OF Internet Explorer 4.0 you *can* get rid of is the Channel bar—essentially, a list of Web pages that IE4 checks at regular intervals for updates. You can view the updated pages in the browser, in a full-screen Channel viewer, or as Active Desktop items. But if the Channel bar disappeared tomorrow, none of our beta testers would miss it.

On the other hand, the Outlook Express e-mail client is a highly successful IE4 innovation. Much simpler and slicker than the Internet Mail and News applets that preceded it, Outlook Express also delivers power-user features such as filters for automatic sorting of incoming mail. Corporate IS types will appreciate Windows 98's Virtual Private Networking—a secure, encrypted networking protocol that permits telecommuters and remote-office workers to log on to a Windows NT server connected to the Internet. (It's also available as a download for Windows 95 users.) Because this feature is proprietary, you can't use it to log directly on to a NetWare or other non-NT server (Microsoft says it will support other VPN technologies once a standard emerges.) But VPN works, and it could save your business hundreds of dollars per month on leased lines and long-distance charges.

what the doctor ordered."

Windows 98 also supports RSVP (resource reservation protocol), another emerging network technology that works with compliant Internet routers to reserve bandwidth between two points. In other words, someday you may be able to purchase faster, more reliable service from Internet service providers that support the new protocol.

Windows 98 at a Glance: Performance

Feature	First appeared in...	What does it do?	Verdict
Faster system boot	Windows 98	Quicker startups on PCs with new FastBoot BIOS—but such systems are still fairly rare.	?
Application Launch Acceleration	Windows 98	Speedier loading of some applications—a boon for the impatient.	👍
MapCache	Windows 98	Disk-caching trick saves memory and boosts speed; we didn't notice much difference.	?
Fast shutdown	Windows 98	Drops network connections instantly.	👍

Performance:
The Fastest Windows Ever?

AS IT HAS WITH EVERY prior version of Windows, Microsoft claims that Windows 98 will be faster than its predecessor. In this case, the speed enhancements focus on four key areas: swifter start-ups, faster shutdowns, more efficient loading of your favorite applications, and better memory management to speed general-purpose Windows jobs such as task-switching.

So is Windows 98 any faster than Windows 95? Our extensive but informal beta testing suggests that it's a smidgen quicker in some areas and a tad slower in others. When we get our mitts on the final version of the operating system next month, we'll run it through a complete battery of WorldBench 98 and custom application tests across a range of hardware. Bottom line: If you decide you want to upgrade to Windows 98, you won't do it because of any dramatic difference in speed.

START ME UP, SHUT ME DOWN

WINDOWS 98'S FIRST TRICK, faster start-up, has one big catch. To employ this feature, you need a FastBoot BIOS—and machines that support this system are just beginning to appear on the market. (In fact, we weren't able to get hold of one in time for our testing.) These new PCs reportedly skip the long system-testing and initialization phase that occurs when you first power them up.

On the other hand, even if your system does have a FastBoot BIOS, there's no guarantee that your computer will start up any faster than it did under Windows 95. Windows 98 loads big chunks of browser code during boot-up, and since Microsoft doesn't give you any way to uninstall IE, you can't get around this problem. If you now use Windows 95 without Internet Explorer, you may find Win 98's slow start-up irritating, especially if you lack a FastBoot BIOS. Several of our testers griped about Windows 98's sluggish boot-up.

Faster shutdowns are another story. Windows 98 noticeably improves on Windows 95 in this area, especially for systems connected to a network (including those using Dial-Up Networking). The reason? While Windows 95 waits patiently for network connections to close in an orderly fashion before telling you to power off the system, Windows 98 just pulls the plug. It's a nice innovation that won't cause problems with your network and will get you out the office door a few seconds faster. ▶

GET LOADED FAST

HOW MUCH TIME do you waste each day waiting for your word processor or browser to load? Cumulatively, it probably totals a couple of days per year. Windows 98's improved Disk Defragmenter utility could put an end to your finger-drumming. Rather than simply rearranging program files into a series of contiguous blocks on the hard drive, as Windows 95's defragmenter does, the Windows 98 version monitors how a particular program loads into memory, and then carefully rearranges that application on your hard drive to achieve maximum loading speed. The software you use most frequently should receive the greatest performance boost. As with disk defragmenting of any sort, how long the process takes will depend on how large the drive is, how full it is, and how badly it's fragmented. Our testers' defrag sessions ranged from less than 20 minutes to several hours. Fortunately, you can schedule Disk Defragmenter to run when you're not using your machine.

Most of our testers reported noticeable if not dramatic improvements in application launching under Windows 98. Standard business apps that were woefully inefficient to start with tended to benefit most. Ponderous loaders like Navigator 4.0 and Word 97 started up faster on most systems, while relatively speedy loaders like Excel 97 showed comparatively little improvement.

Ponderous applications like Paradox and Navigator loaded noticeably quicker under Windows 98.

Windows 98's last major performance tweak is the toughest to explain and the most difficult to measure. Both DOS and Windows have long boosted performance by using disk caching—keeping a copy of the most likely needed and the most frequently accessed disk files in a chunk of RAM set aside for the job. Windows 98's caching introduces a time- and memory-saving shortcut dubbed MapCache. Instead of copying files from cache into main memory, Windows 98 treats the cache's contents as part of main memory. The result: Windows doesn't have to copy the file (a time saver), and consequently it expends only half as much RAM. In Windows, memory equals speed.

Is anyone but a devoted Windows geek likely to notice MapCache's benefits? We didn't, but we'll let you know more next month, once we complete our testing on the shipping version.

Hardware Support: Good News, Bad News

THREE YEARS MAY be just a blip in the life cycle of an evolving operating system, but for hardware it's an eon. Today's PCs sport peripherals and hard drive capacities that did not exist when Windows 95 was born. Overall, Windows 98 does a decent job of keeping up with evolving PC technologies, but we also saw prerelease incompatibilities with existing devices.

On the plus side, Windows 98 natively supports just about every acronym coming down the pike—USB, DVD, 3D graphics with AGP, and more. Though Win 95 also supports these technologies to some degree, Windows 98 integrates them more fully into the operating system, and the Win 98 CD-ROM comes stuffed with up-to-date drivers. In theory, this should make for easier installations and smoother performance.

Indeed, setting up a Storm PageScan USB scanner under Windows 98 couldn't have been much simpler: When one beta tester pressed the scanner's cable into his machine's USB port, Windows 98 instantly identified the device, asked for the Windows 98 disc, and got the scanner up and running within seconds. By contrast, installing the same scanner under Windows 95 requires using the PageScan's own CD-ROM and then rebooting the system.

Windows 98 at a Glance: Hardware Support

Feature	First appeared in...	What does it do?	Verdict
Universal Serial Bus	Windows 95 OSR 2.1 (improved in Win 98)	Improves Windows' shaky support for USB devices.	👍
Native DVD Support	Windows 98	Supports Dolby AC3 audio, includes movie player.	👍
FAT32 converter	Windows 98	Quick and easy FAT16-to-FAT32 conversion.	👍
WaveTop	Windows 98	Broadcast data receiver displays stock ticker, news, and more.	👍
WebTV for Windows	Windows 98	Supports TV tuner and on-screen program guide; interactive TV due later this year.	?

FAT CITY

IF YOU HAVE A big hard disk, you'll appreciate Windows 98's improved support for the 32-bit file allocation table file system (or FAT32). It uses smaller cluster sizes than the old FAT16 ▶

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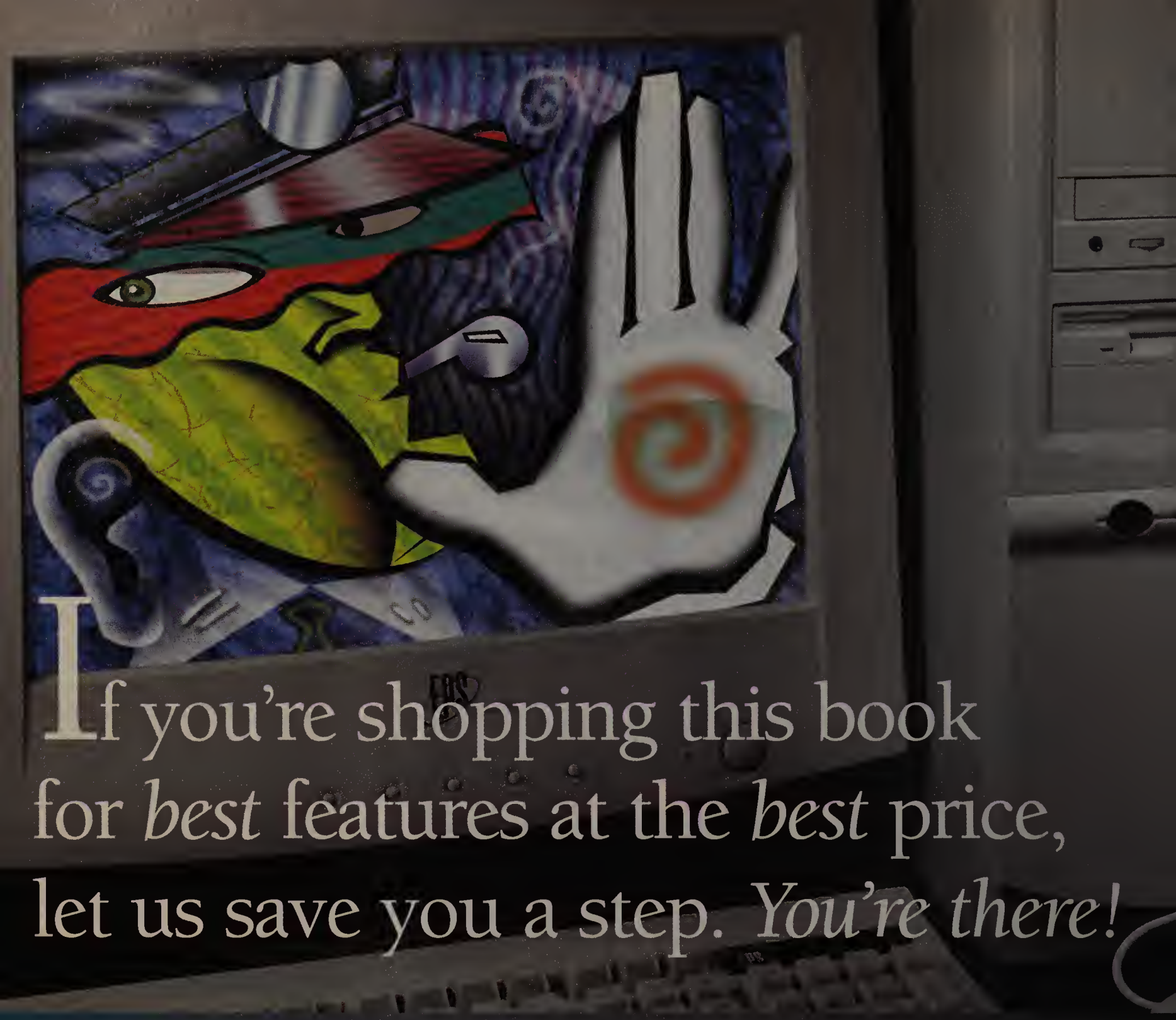

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standard did, which enables you to recover wasted disk space (hundreds of megabytes, in some cases) and to create partitions larger than 2GB. Windows 95 OSR 2 and later support FAT32, but converting a Win 95–based drive from FAT16 to FAT32 isn't easy.

Windows 98 simplifies matters by supplying a utility that lets you painlessly convert your drive to FAT32. (The conversion is almost instantaneous, but you have to defrag your disk as part of the process.) Once you've converted, the only way to go back to FAT16 is with a third-party utility such as PowerQuest's PartitionMagic. In our tests, FAT32 proved to be quite stable and not noticeably slower than FAT16. If you have an older Win 95 system, FAT32 could provide some much-needed breathing room to your cramped hard drive.

Next Stop, NT 5.0?

YOU'VE WEIGHED THE PROS AND CONS of upgrading to Windows 98, and you're still not sure whether to take the plunge. Consider another option: waiting for Windows NT Workstation 5.0.

Of course, Windows NT 5.0, like Windows 98, integrates Internet Explorer into its interface—a no-no as far as the Department of Justice is concerned. And while the antitrust folks may be too late to slow Windows 98, they could move sooner on Windows NT in an attempt to keep it out of consumers' hands. Even so, Microsoft hopes to finish work on NT by the end of 1998.

Assuming Microsoft doesn't alter its development plans, the OS will appeal to corporate users, with an emphasis on security, stability, and manageability that Windows 98 lacks. NT 5.0 should also include virtually all of the Windows 95 and Windows 98 features absent from NT 4.0. It will provide the Plug and Play peripheral configuration and notebook power management, and it will incorporate Windows 98 features such as the revised user interface and Internet Explorer 4.0 integration, plus support for Universal Serial Bus devices.

But some old NT hobgoblins will still lurk in the corners: Microsoft says certain applications and peripherals (older ones, especially) will continue to present compatibility problems, and the OS will require a significantly more potent PC than Windows 98 does.

Unlike earlier NT releases, version 5.0 should install over Windows 95/98 as well as over DOS or Windows 3.1. It may be fairly simple (albeit costly) to upgrade to Windows 98 now, then move to NT 5.0 when it becomes available. But even Microsoft says few companies will do that: "I have yet to meet a medium-size to large company that would roll out two operating system upgrades in one year," says Russ Madlener, a product manager for Windows. That means firms still clinging to Windows 3.x could well skip Windows 98 and play the Windows waiting game a bit longer.

—Harry McCracken

Some old NT hobgoblins will continue to lurk in the corners: Older apps and peripherals may not be compatible.

Less useful is Windows 98's support for multiple monitors. If you have enough open PCI slots (and video cards to fill them), you can link up to eight displays to a single PC and view different applications on each. You might work in a word processor on one monitor while keeping your e-mail open on another. However, you shouldn't count on this feature working with your graphics cards. It supports only certain PCI and AGP graphics chips—including some (but not all) popular models.

Windows 98 seems poised for the coming television-Internet convergence. Add a TV tuner card to your PC, connect it to an antenna or cable, and Windows 98's new WebTV for Windows tools will let you watch Oprah while you read your e-mail. The OS even comes with a built-in guide to local TV listings. In beta form, however, this TV tuner software was slow and unstable, clashed with Windows 98's screen savers, and locked up regularly even when nothing else was running.

WHAT DO YOU want to watch tonight? Windows 98's WebTV for Windows software lets you browse your local TV listings.

YOUR HARDWARE'S NO GOOD HERE

THOUGH WINDOWS 98 offers plenty of support for new hardware, we were surprised at the number of problems we ran into while trying to get existing devices to work smoothly with the prerelease version. Practically every *PC World* beta tester reported compatibility glitches, including problems with mice, video cards, graphics tablets, and modems. ▶

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No purchase necessary. Sweepstakes ends 1/27/99. Void where prohibited. For official rules and alternate entry method, write to AT&T WorldNet Rules, P.O. Box 7408, Melville, NY 11775-7408. Florida residents: see complete Sweepstakes rules on adjacent page.

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On-line entries must be received between 12:00 a.m. ET on Thursday, April 30, 1998 and 11:59 p.m. ET on Wednesday, July 29, 1998 to be eligible for the second quarterly drawing. On-line entries must be received between 12:00 a.m. ET on Thursday, July 30, 1998 and 11:59 p.m. ET on Wednesday, October 28, 1998 to be eligible for the third quarterly drawing. On-line entries must be received between 12:00 a.m. ET on Thursday, October 29, 1998 and 11:59 p.m. ET on Wednesday, January 27, 1999 to be eligible for the fourth and final quarterly drawing. **Grand Prize Drawing:** All on-line entries received between 12:00 a.m. ET on Thursday, January 29, 1998 and 11:59 p.m. ET on Wednesday, January 27, 1999 will be eligible for the Grand Prize drawing. Use of automated entry devices or programs is prohibited. Normal Internet access and usage charges imposed by AT&T WorldNet Service will apply. 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There will be weekly drawings between January 29, 1998 and January 27, 1999 from among all on-line/paper entries received for each week, four quarterly drawings and one Grand Prize drawing at the end of the promotion from among all entries received. Enter as often as you wish by mail, but each paper entry must be mailed separately, be postmarked by the Wednesday following the week in which you wish to be entered and received no later than one week after postmark date. No photocopies, reproductions or facsimiles allowed. Sponsor is not responsible for late, lost, illegible, incomplete, stolen, misdirected or postage-due mail. All paper entries received will be entered in the weekly and quarterly drawings that correspond to their postmarks. Paper entries postmarked by Wednesday, April 29, 1998 and received by May 6, 1998 will be eligible for the first quarterly drawing and the Grand Prize drawing. 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Includes round-trip economy-class air transportation from a major airport closest to winner's home to New York, dinner in NYC, round-trip business-class air transportation from New York to Paris, five-night deluxe hotel accommodations (double occupancy), including breakfast, five nights of gourmet dining at selected Michelin 3-star restaurants, midnight show at The Lido cabaret, guided tour of the palace at Versailles, followed by lunch, morning cooking class at Escoffier Cooking School and $5,000 spending money. (Est. Retail Value $30,000); Fourth Quarter Prize: A trip for two to Bali, Indonesia. 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Winner Selection:** Winners will be selected in a random drawing from among all eligible entries received. Drawings will be conducted by National Judging Institute, Inc., an independent judging organization whose decisions are final on all matters relating to this sweepstakes. The quarterly drawings will be conducted on or about June 5, 1998, September 4, 1998, December 4, 1998 and March 3, 1999. The Grand Prize drawing will be conducted on or about March 3, 1999. Odds of winning are dependent upon the number of entries received. Limit one weekly prize per person per week. **4. Instant Win Entry:** Look for an Instant Win Game icon that is located on the Sweepstakes site after clicking the "Play the Game" button. Click on the icon to play the game. If you are a winner, the message will indicate "Winner." If you are not a winner, the message will indicate, "Try Again." Limit ten opportunities to determine whether you are a winner per person per day. 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The first person who plays after a randomly selected time will be a winner (subject to verification). If no play is made after a randomly selected time, and the 24-hour clock changes to the next day, no prize will be awarded for that time. Likelihood of winning depends on the randomly selected time and a participant being the first to play after the randomly selected time. **6. General Conditions:** The Grand Prize and all weekly and quarterly prizes will be awarded and winners will be notified by e-mail or regular mail. In the event the Grand Prize or any Quarterly Prize is won by a minor, it will be awarded in the name of a parent or legal guardian. Prizes are nontransferable and no substitutions are allowed except by sponsors who reserve the right to substitute a prize of equal or greater value if advertised prize is unavailable. 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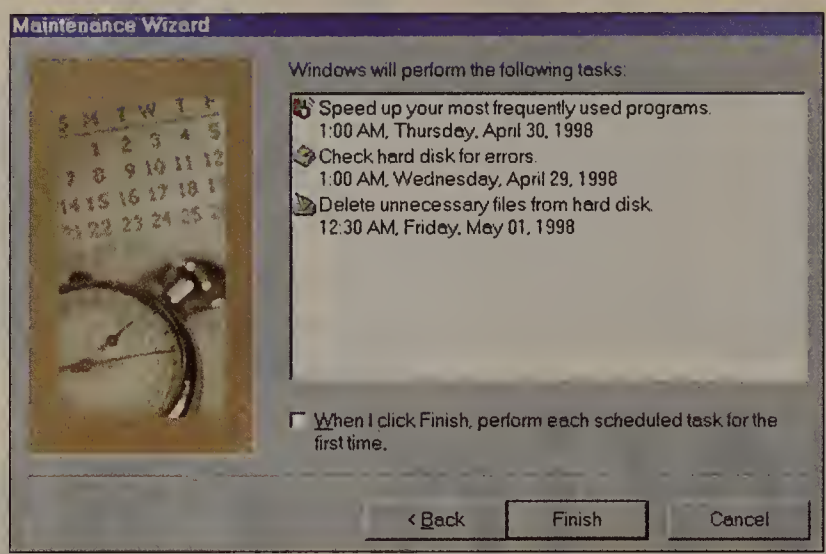

And who can forget Bill Gates's embarrassing encounter with a scanner in front of a large Spring Comdex audience? A company spokesperson says that "Microsoft is going to address as many of the known issues as possible" before the final code ships. Until the shrink-wrapped version of Windows 98 arrives, we'll have to hope that these stumbles are simply due to ordinary beta jitters.

Housekeeping:
Keeping Win 98 Alive

ALMOST EVERY DAY, something in Windows goes awry: Deadwood files clutter your drive; software bugs make the OS unstable; and damage to the Registry can sink your system. Windows 98 assembles a grab bag of nifty housekeeping tools, and offers a way to keep up with future updates and bug fixes. (For more details on new utilities, see *Windows Tips* in this issue.) These are among the few Win 98 enhancements that really *are* completely new.

CLEAR THE DEADWOOD

WINDOWS LOVES FREE disk space—and for good reason: It needs all that room for its Virtual Memory swap file. When your disk fills up, the swap file gets smaller and performance degrades. Windows 98's hard drive housekeeper, Disk Cleanup, helps you nuke temporary files, cached Web pages, Java applets, and other digital detritus.

THE NEW Maintenance Wizard, Version Conflict Manager, and other system tools should help keep Windows 98 running reliably.

The System Information utility brims with other helpful gadgets. The Windows Report Tool lets you e-mail a problem report (including your system configuration) to Microsoft or your company's help desk. With the System Configuration utility, you can turn off programs and system tray applets that launch automatically when your PC starts. The System File Checker spots missing or corrupted Windows DLL files and other crucial items and helps restore the originals.

The Windows Registry has been the system's Achilles' heel for years. Windows 98's Registry Checker gives you some long-overdue tools for correcting many kinds of Registry problems and automatically creates Registry backups.

Of course, the new OS is sure to have its share of bugs. Windows 98 aims to simplify swatting them with Windows Update, a shortcut to a special Microsoft Web page that will keep track of patches available for Windows 98. This could be a dream come true for frustrated users, but its value will depend on how diligently Microsoft maintains the site.

MY OS WON'T WAIT

THE ARRIVAL OF Windows 98 isn't an earthshaking event. But if you decide to make the leap to the new OS, you probably won't regret it—the bug fixes and system maintenance utilities alone make it worth the money.

When you add it up, Windows 98 is the best (and Microsoft says, the last) version of Windows 9*X*. If the company works out the final hardware glitches, you may find Windows 98 a worthwhile upgrade. Heck, you'll probably get it anyway with the next PC you buy—unless Windows NT captures your heart first.

Windows 98 at a Glance: Housekeeping

Feature	First appeared in...	What does it do?	Verdict
Windows Update	Windows 98	Autoinstalls bug fixes, updated drivers, and add-ons; a great idea if it works.	?
Disk Cleanup	Windows 98	Frees disk space by deleting unnecessary files.	👍
Maintenance Wizard	Windows 98	Schedules unattended disk defragmentation and cleanup.	👍
Windows Report Tool	Windows 98	E-mails information to Microsoft or in-house tech support.	?
System File Checker	Windows 98	Fixes damaged or missing system files.	👍
Registry Checker	Windows 98	Heals and backs up the Windows Registry—it's about time.	👍

online *For the latest news on the Microsoft antitrust suit, see PC World Online (www.pcworld.com/microsoftnews). Scott Spanbauer is a senior associate editor and Harry McCracken a senior writer for* PC World. *Staff editor Angela Navarrete, senior associate editors Denny Arar and Brad Grimes, and executive editors Jim Welp, Eric Bender, and Daniel Tynan contributed to the story.* ■

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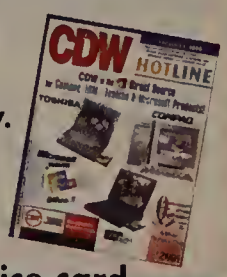

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Computer Shopper Top 100 1997 — Optiquest V775 October 1997

July 1997 Macworld Star Rating ★★★★ 7.1 — Optiquest V773 July 1997

Family PC Recommended — Optiquest V95 December 1997

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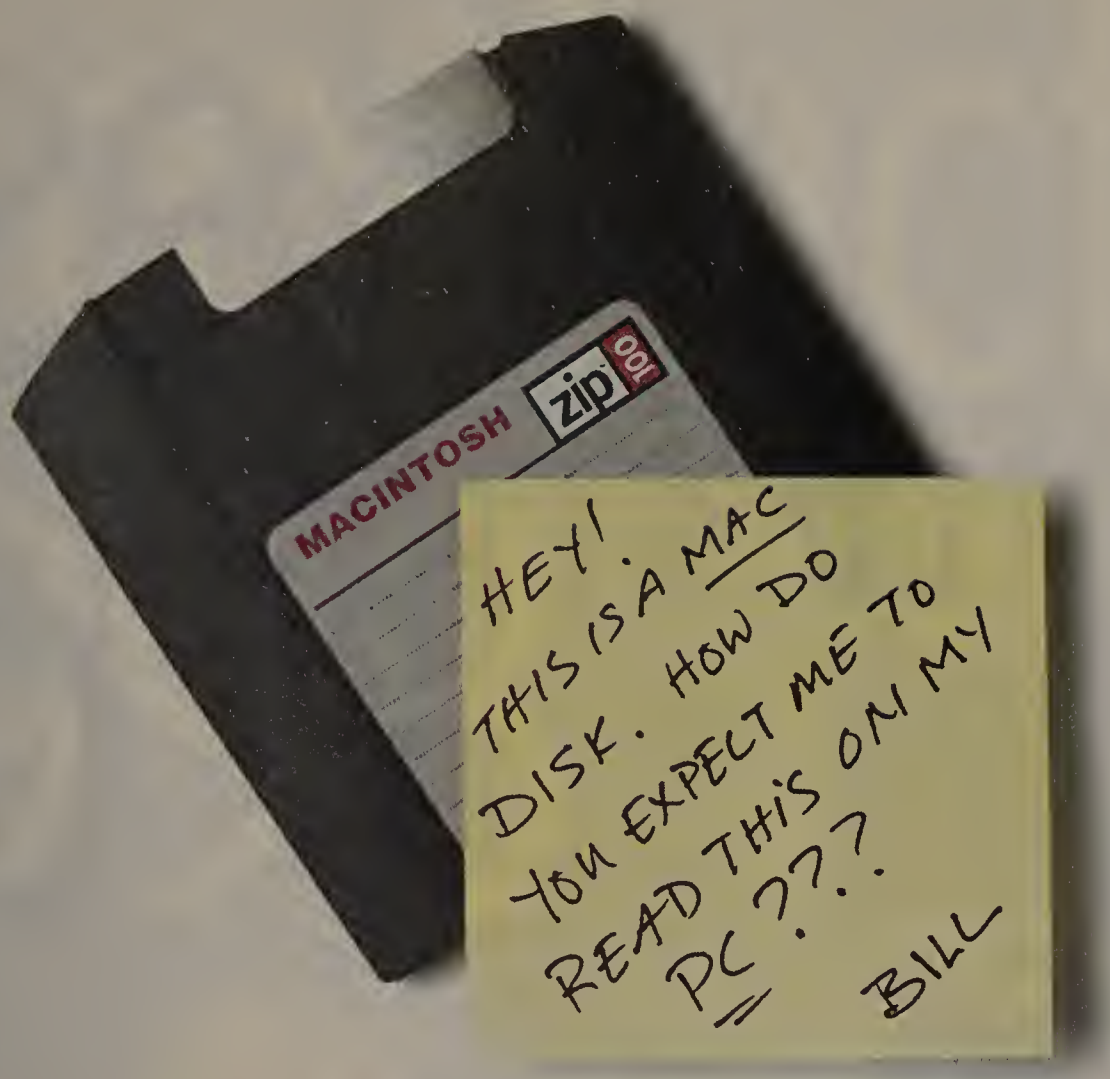

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Best of WORLD CLASS

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WHAT'S THE BEST sports team? The one that beats all the others, year after year. The best investment? The one that grows the most over time. How about the best movie? This year it was the one that featured the coolest special effects. (Hint: There was a very large boat in it.)

So what makes a PC product the best in its class? To answer that question, *PC World*'s editors, testers, and contributors examined the entire gamut of products that have appeared in our pages over the past year. The result: our 16th annual World Class Awards, honoring the top hardware, software, and Web products in the PC realm.

In our search for the best, we looked at four factors: performance, value, consistency, and innovation. Some products shone in all four categories. With others, one or two traits were enough to catapult them to the top.

Some companies that made the best products last year have made those products even better. Kudos go to Intuit ▶

BY PC WORLD EDITORS

No long-winded speeches. No boring production numbers. And absolutely no commercial breaks. PC World's 16th

Products 1998

annual World Class Awards deliver nothing but great products—all 85 of them.

PHOTOGRAPHS BY KEVIN CANDLAND

for its latest versions of Quicken and TurboTax; to Symantec for the newest Norton AntiVirus; and to Dell for its Pentium II line of Dimension PCs. Several other products that led the pack a year ago, like Office 97, are also still the best.

Cool new stuff? Voice recognition is finally worth talking about, thanks to Dragon NaturallySpeaking. Digital cameras are easier to use with the advent of Sony's Mavica MVC-FD7, and PDAs like the REX PC Companion now come in sizes as small as a business card.

But you won't read much here about ADSL, Net PCs, or USB, among other hyped technologies. High-speed Web access, no-fuss computers, and easy-to-install peripherals are still on the horizon. And even though Microsoft still makes the best products in several categories, the past 12 months have not been kind to the software giant, making it our runaway choice for "Loser of the Year."

For now, though, let this article be your guide to the best PC products and companies. In some cases we've named runners-up where we thought more than one product deserved attention. If your opinions differ from ours, let us know. And tell us what you thought of *Titanic*.

Computer Essentials

Best Business Desktop PC
Dell Dimension XPS D Series

Like scandal in the White House, Dell has been a virtual fixture atop our power desktops chart this year. By keeping prices low and technology high—64MB of SDRAM, roomy 8GB hard drive, AGP graphics, and more—Dell has made its Dimension XPS D line an exceptional value. • **Dell**, 800/388-8542, www.dell.com

READER SERVICE NO. 730

Runner-up: Micron Millennia Series. This line is fast, support keeps improving, and Micron has pioneered the use of some parts, like Zip drives, as standard. • **Micron**, 888/634-8799, www.micronpc.com

READER SERVICE NO. 731

Best Home Desktop PC
Gateway G Series

Last year around the holidays, Gateway got our attention with its budget G5 series, earning Best Buys from November 1997 to February 1998. These Pentium MMX systems deliver enough power for most homes and sometimes come with an ink jet printer—all for around $1500. Now the G6 series brings power and value to the top of the charts. • **Gateway**, 800/846-2000, www.gateway.com

READER SERVICE NO. 732

Best Computer Essentials (clockwise from left): Iiyama Vision-Master 450, Gateway G Series, Dell Inspiron Series

Runner-up: Dell Dimension XPS D Series. For home buyers, Dell bundles its powerful D series with features like a subwoofer and Microsoft Home Essentials 98. • **Dell**, 800/388-8542, www.dell.com

READER SERVICE NO. 733

Best Sub-$1000 PC
IBM Aptiva E Series

Think all IBM PCs are pricey? Think again. The $699 Aptiva E16 (without a monitor, which starts at $199) isn't built for speed—it comes with an AMD K6-166 chip and 16MB of RAM—but the well-designed package includes a 56-kbps modem, an ATI Rage II 3D graphics card, and Lotus SmartSuite 97. Its faster sibling, the E26, has also dropped well below $1000. • **IBM**, 800/426-7235 ext. 4340, www.pc.ibm.com/aptiva

Runner-up: Compaq Presario 2200 Series. Arguably the first sub-$1000 PCs, Compaq's Presario 2240 and siblings deliver high quality at low prices. • **Compaq**, 800/345-1518, www.compaq.com

READER SERVICE NO. 734

Most Promising Hardware Newcomer

The Sub-$1000 PC

SURE, IT'S NOT AS FAST as today's top-of-the-line systems. It typically comes with limited RAM, a relatively slow processor, and a basic graphics card that can't run today's latest 3D games. And that tempting price usually doesn't include a monitor. Still, we're pleased that companies like Acer, Compaq, Hewlett-Packard, and IBM spent part of their time this year building quality PCs that sell for around $1000.

Consumers are happy too. No wonder: How many people really want to spend $2500 on a system that will probably be outdated in six months? If all you want to do is send e-mail, work on documents, and browse the Net, a cheap PC might be the ticket. Is it a gimmick? A flash in the pan? Time will tell. But for bravely serving a market where profits aren't so grand, the makers of the sub-$1000 PC get our salute.

Best Notebook PC
Dell Inspiron Series

You want speed? Dell's got speed. The company has an uncanny knack for building really fast notebooks. The $3199 Inspiron 3200 D266XT is the quickest of the bunch. It's sturdy and has a brilliant 13.3-inch active-matrix screen. If only it came standard with a modem, we'd never stop talking about it. • **Dell,** 800/388-8542, www.dell.com

READER SERVICE NO. 735

Runner-up: Gateway Solo 2300 Series. They stalked the top of our power notebooks chart from December 1997 to March 1998, and now they're looking to lay claim to the budget chart. These babies use a variety of CPUs to match any pocketbook, and their batteries keep going and going. • **Gateway,** 800/846-2000, www.gateway.com

READER SERVICE NO. 736

Best Monitor
Iiyama VisionMaster 450

Big, bright, and beautiful—that's the VisionMaster 450. This $765 display is the best argument yet for moving up to 19 inches. Its sharp text and vibrant colors stand out, and with the extra viewing area, you can see even more of your spreadsheets, Web pages, and other documents. • **Iiyama,** 800/394-4335, www.iiyama.com

READER SERVICE NO. 737

Runner-up: Mitsubishi Diamond Pro Series. These monitors consistently impress us with their superior picture. Prices range from $1649 for the 21-inch Diamond Pro 1000 to $549 for the 17-inch Diamond Pro 87TXM. • **Mitsubishi,** 800/843-2515, www.mitsubishi-display.com

READER SERVICE NO. 738

Best Graphics Board
STB Velocity 128

It's been a big year for combination 2D/3D graphics boards. The $129 Velocity 128, with its groundbreaking nVidia Riva 128 graphics chip, proved that you can have both fast 2D performance and good 3D image quality. And with its price falling, it's the ideal choice. • **STB Systems,** 800/234-4334, www.stb.com

READER SERVICE NO. 739

Runners-up: Creative Labs 3D Blaster Voodoo2 and Diamond Monster 3D II. These 8MB 3D-only cards ($229 and $249, respectively) are the best for playing 3D games on the PC. • **Creative Labs,** 800/998-5227, www.soundblaster.com

READER SERVICE NO. 740

• **Diamond Multimedia,** 800/468-5846, www.diamondmm.com

READER SERVICE NO. 741

Best Sound Board
Creative Labs Sound Blaster AWE64 Gold

For the sixth straight year, a Sound Blaster brings home the gold—and this year the gold is literal. The $149 Sound Blaster AWE64 Gold appeals to audiophiles with 64-voice wavetable MIDI, a great selection of audio software, and even gold-plated ports for better output. The 4MB of MIDI samples from E-mu Systems produce superior realism, and gamers can rest easy knowing the card is truly Sound Blaster compatible. • **Creative Labs,** 800/998-5227, www.soundblaster.com

READER SERVICE NO. 742

Runner-up: Diamond Monster Sound M80. Creative Labs beware. This $99 PCI-based card may herald a changing of the guard. It has impressive positional 3D audio effects and 32-voice MIDI playback. • **Diamond Multimedia,** 800/468-5846, www.diamondmm.com

READER SERVICE NO. 743

Best Hard Drive
Maxtor 8.4GB DiamondMax 2160

With so much important stuff living on your hard drive these days—apps and files, cookies, cached Web pages, even captured video—you need a hard drive you can trust. Our favorite is this $279 unit (see "Godzilla-Size Hard Drives"). It's roomy (8.4GB), great for multimedia apps, and backed by Maxtor's support ▶

Product of the Year

Intel Pentium II

INTEL'S FLAGSHIP CHIP proves that power doesn't have to come at a high price. In less than a year, the Pentium II revved up from 233 MHz to 400 MHz. Couple a 400-MHz PII chip with the new 100-MHz system bus, and you get machines that are 67 percent faster than PCs powered by lowly Pentium 233s (see "400-MHz Pentium IIs: The Great Leap Forward," June). At the same time, the cost of a PII chip has dropped drastically, as Intel felt the heat from AMD and Cyrix. The result: desktop PCs that look and feel like workstations. That's why the Pentium II is our Best Product of 1998.

with its stellar reputation. • **Maxtor,** 800/262-9867, www.maxtor.com

READER SERVICE NO. 744

Runner-up: Seagate MedalistPro 6451. If you can do with a little less space, Seagate's 6.4GB drive will save you about $50. It's an outstanding general-purpose drive; complete installation instructions are printed right on it. • **Seagate,** 800/732-4283, www.seagate.com

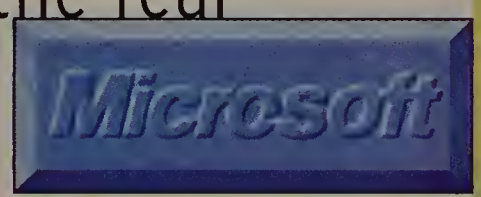
READER SERVICE NO. 745

Best CD-ROM Drive
Plextor UltraPlex PX-32CSi

In practical terms, 32X isn't much faster than 24X. But if you spend your days scanning CD-ROM databases, every bit of speed helps. Plextor's $249 SCSI CD-ROM drive is the fastest of this company's excellent line. For those who need extra speed now and can't wait for DVD prices to drop, the upgrade is worth it. • **Plextor,** 800/886-3935, www.plextor.com.

READER SERVICE NO. 746

Loser of the Year



THAT PIE IN THE FACE last February wasn't the only creaming that Bill Gates took this year. Microsoft's flagship applications—Office 97, Money 98, Internet Explorer 4.0—bred more bugs than a Florida swamp. Every week seemed to bring news of yet another IE 4.0 security hole. Windows 97 turned into Windows 98 (and still hadn't shipped at press time), and NT 5.0 was put off until 1999. A U.S. Department of Justice action forced the company to alter some of its business practices, while a consumer backlash had users pining for non-Microsoft alternatives (Linux, anyone?). The only place the software titan didn't get hit was in the wallet—the company racked up big profits. And its products are still best of breed in most categories, having outlived most competitors.

PC Peripherals

Best Personal Printer
Epson Stylus Color 800

Here's a case where we recommend you spend a little more to get the best. Epson's $299 Stylus Color 800 costs more than some of our other top-rated printers, but it has a long history of quality. It's fast, easy to use, and produces color photos that are among the sharpest you'll see from any printer. • **Epson,** 800/463-7766, www.epson.com

Runner-up: Hewlett-Packard DeskJet 722C. With its laserlike text and crisp color graphics—on plain paper, yet—HP's well-designed $299 ink jet is a fine choice for small and home offices. • **Hewlett-Packard,** 800/752-0900, www.hp.com

READER SERVICE NO. 747

Best Modem
3Com U.S. Robotics 56K Faxmodem External

Snicker if you must at the "56K" in the product name, but 3Com will do right in upgrading this speedy, reliable modem. The company says if you've already bought one, you'll get a free upgrade to the universal 56-kbps standard, even if 3Com has to send you a new modem. So you can feel good about this $180 device. • **3Com,** 800/342-5877, www.3com.com/56k

READER SERVICE NO. 748

Runner-up: Diamond SupraExpress 56i. Diamond's $119 internal K56flex modem is a snap to install, and it's packed with features like voice mail and support for Caller ID and speakerphones. • **Diamond Multimedia,** 800/727-8772, www.diamondmm.com

READER SERVICE NO. 749

Best Input Device
Logitech MouseMan+

People's hands are shaped the same wherever you go. So can anyone explain all the different shapes of ergonomic mice? In our opinion, Logitech gets it right with the $60 MouseMan+. It's designed for comfort, with a built-in wheel for scrolling through Windows 95 applications, and it's easy to program. • **Logitech,** 800/231-7717, www.logitech.com.

READER SERVICE NO. 750

Best Scanner
Visioneer PaperPort OneTouch

Aside from free-falling prices, it's been difficult to find anything new and exciting about flatbed scanners. Until now, that is. Visioneer's new $249 scanner has a neat set of buttons that allows you to scan, fax, copy, and print. The company also makes the best software for adjusting, filing, and annotating scanned images. • **Visioneer,** 800/787-7007, www.visioneer.com

READER SERVICE NO. 751

Best DVD Drive
Creative Labs PC-DVD Encore Dxr2

Want in on the new multimedia? Check out the $300 PC-DVD Encore. The 2X DVD drive can read both CD-Recordable and CD-Rewritable discs and spins CD-ROMs at a fast 20X. The media card produces superior MPEG-2 video and uses a loopback cable to eliminate compatibility snafus with existing graphics cards. • **Creative Labs,** 800/998-5227, www.soundblaster.com

READER SERVICE NO. 752

PC Peripherals (from left): Logitech MouseMan+, REX PC Companion, Nokia 9000i Communicator, Sony Mavica MVC-FD7

Best PC Peripherals (clockwise from top): Epson Stylus Color 800, 3Com U.S. Robotics 56K Faxmodem External, Creative Labs PC-DVD Encore Dxr2

Best Removable Storage Drive
SyQuest SyJet 1.5GB EIDE

The $299 SyJet's cartridges hold more data than any removable media we've tested this year. The drive is fast, easy to install, and at 5 cents per megabyte of storage, a terrific bargain. This is the solution for your business PC.

Runner-up: SyQuest SparQ 1.0GB. The budget-conscious user may opt instead for this speedy $199 drive, which uses 1GB cartridges that cost but a trifling $39 each. • **SyQuest,** 800/245-2278, www.syquest.com

READER SERVICE NO. 753

Best Recordable CD-ROM Drive
HP CD-Writer Plus 7200i

Record all your favorite songs on a CD, then record over them. This $499 internal CD-Rewritable drive lets you record repeatedly over the same CD. We found it fast, and easy to install (see "Cut Your Own CDs," June). • **Hewlett-Packard,** 800/752-0900, www.hp.com/go/cdr

READER SERVICE NO. 754

Runner-up: TEAC 4x12 External CD Recorder. If you don't need to rewrite CDs, this fast $549 CD-Recordable SCSI drive is the one for you. • **TEAC America,** 800/888-4923, www.teac.com

READER SERVICE NO. 755

Best Personal Digital Assistant/Palmtop
3Com Palm III

The Newton may be dead, but the PalmPilot grows stronger by the day. 3Com's PDA streamlines calendar and address book management and provides great connectivity to desktop PCs. The new $399 Palm III ups the ante with a sleeker case, more RAM, and other refinements. • **Palm Computing/3Com,** 800/881-7256, www.palm.com

READER SERVICE NO. 756

Runner-up: Psion Series 5. Combining software that's better than Windows CE with a notebooklike QWERTY keyboard, Psion's $499 unit is a powerhouse among palmtops. • **Psion,** 800/997-7466, www.psion.com

READER SERVICE NO. 757

Best Digital Camera
Sony Digital Mavica MVC-FD7

Finally, storing digital images and transferring them to your PC is as simple as popping out a floppy. That's because Sony's $799 Mavica uses standard 3.5-inch disks to hold your pictures—just one of the innovations that earn it our award. The images it captures are top-notch, and the camera is, well, a snap to use. • **Sony,** 800/222-7669, www.sony.com/mavica

READER SERVICE NO. 758

Best Wireless Communications Product
Nokia 9000i Communicator

It's a cell phone, a fax machine, and a handheld computer—all three in one device. Flip open the $999 Nokia Communicator, and you'll find an 8MB PDA complete with a regulation-style QWERTY keyboard, a 640 by 200 LCD screen, and a Web browser. It's pricey, but definitely a road warrior's dream. • **Nokia,** 888/665-4228, www.nokia9000.com

READER SERVICE NO. 759

Best Gadget
Rolodex Electronics REX PC Companion

Credit Rolodex Electronics with creating a brand-new category of pocket-size computers: the fingertop. This ingenious little $179 gizmo crams all your personal information into a device the size of a regular business card. It's incredibly portable and fun to use. • **Rolodex Electronics/Franklin Electronic Publishers,** 800/266-5626, www.franklin.com

READER SERVICE NO. 760 ▶

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Performance and service that fit your life.

We make computers one at a time and to order. That's the only way we know how. Tell us what you want to do, and we'll create unique solutions customized to fit your life.

Being a direct vendor, CyberMax is able to offer you more of the very latest in technology and the most current pricing when compared to any retail store. One example is the new **100MHz BUS** and CPU speeds up to 400 MHz. The new BX chipset from Intel and the Aladdin V chipset from ALi have enabled CyberMax systems to break speed records. Our PowerMax systems increase productivity, no matter how demanding your work load gets.

*CyberMax named in Top-5 Technology listing**

1	NEC
2	Gateway 2000
3	Micron
4	Dell
5	CyberMax

Awards tell the world CyberMax builds a computer every bit as good as the big names. We just happen to sell them at a lower price. At CyberMax, we don't build computers to win awards. We build computers to solve the problems you face in life, in business or at home.

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"If only the best will do, you want to shop at the direct companies that offer the latest technologies... CyberMax continues to provide consumers with plenty of choices."
*PC Computing "The Direct 100" February '98

Web Surfer GXM-233

- Cyrix MMX-EnhancedMediaGX™ 233MHz Processor w/ Integrated Sound and Video
- 32MB SDRAM
- 2.1GB Hard Drive
- CyberMax 15" (13.8" VA) Color Monitor
- 24x Max EIDE CD-ROM
- K56flex™ Voice/Fax Modem w/ Speakerphone (V.90-ready)
- Altec Lansing ACS90 Speakers
- Free Windows 98 Upgrade*
- Corel WordPerfect Suite 8 & Max's Multimedia Pack

D701 **$849**

Upgrade to 4.3 HDD.....$49

Home Organizer CII-300

- Cyrix 6x86MXMII™ 300 Processor w/ MMX™
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- CyberMax 17" (15.7" VA) Color Monitor
- 32x Max EIDE CD-ROM
- K56flex™ Voice/Fax Modem w/ Speakerphone (V.90-ready)
- Ensoniq AudioPCI™ 32-bit Sound
- Altec Lansing ACS90 Speakers
- Free Windows 98 Upgrade*
- Corel WordPerfect Suite 8 & Max's Multimedia Pack

D702 **$1199**

Cyrix 6x86MX™ 266+.....$1149
Pentium® II 266MHz.....$1249

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- Cyrix 6x86MXMII™ 333 Processor w/ MMX™
- 64MB SDRAM
- 6.4GB Hard Drive
- Mpact2 AGP Multimedia Accelerator (2D/3D/DVD) w/ 4MB RDRAM
- CyberMax 19" (18" VA) Color Monitor
- Toshiba DVD-ROM II (20X CD-ROM)
- K56flex™ Voice/Fax Modem w/ Speakerphone (V.90-ready)
- Ensoniq AudioPCI™ 32-bit Sound
- Altec Lansing ACS45 Powercube Speakers & Subwoofer
- Free Windows 98 Upgrade*
- Corel WordPerfect Suite 8 & Max's Multimedia Pack

D703 **$1699**
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Cyrix 6x86MX™ 300+.....$1649
Pentium® II 333MHz.....$1899

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- Altec Lansing ACS45 Powercube Speakers & Subwoofer
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- Microsoft Office 97 SBE & Max's Productivity Pack

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"If you're looking for speed in everyday Windows applications, but don't want to spend the money for a 266MHz PII system, check out the CyberMax."
- Home PC Lab Winner/Home PC

For the second time, in a few short months, CyberMax received PC Computing's 5 Star Award. This time it was for our Cyrix 6x86MX, which offers exceptional value and performance when compared to the Pentium II. *"You won't find a better deal for Windows NT at these speeds."*
- PC Computing 5 Star Award September 1997

Every month for the last year CyberMax has appeared on PC World's Top-20 Budget Desktop list. As one analyst wrote, *"CyberMax delivers a lot of bang for the buck."*
- PC World Top 20 List

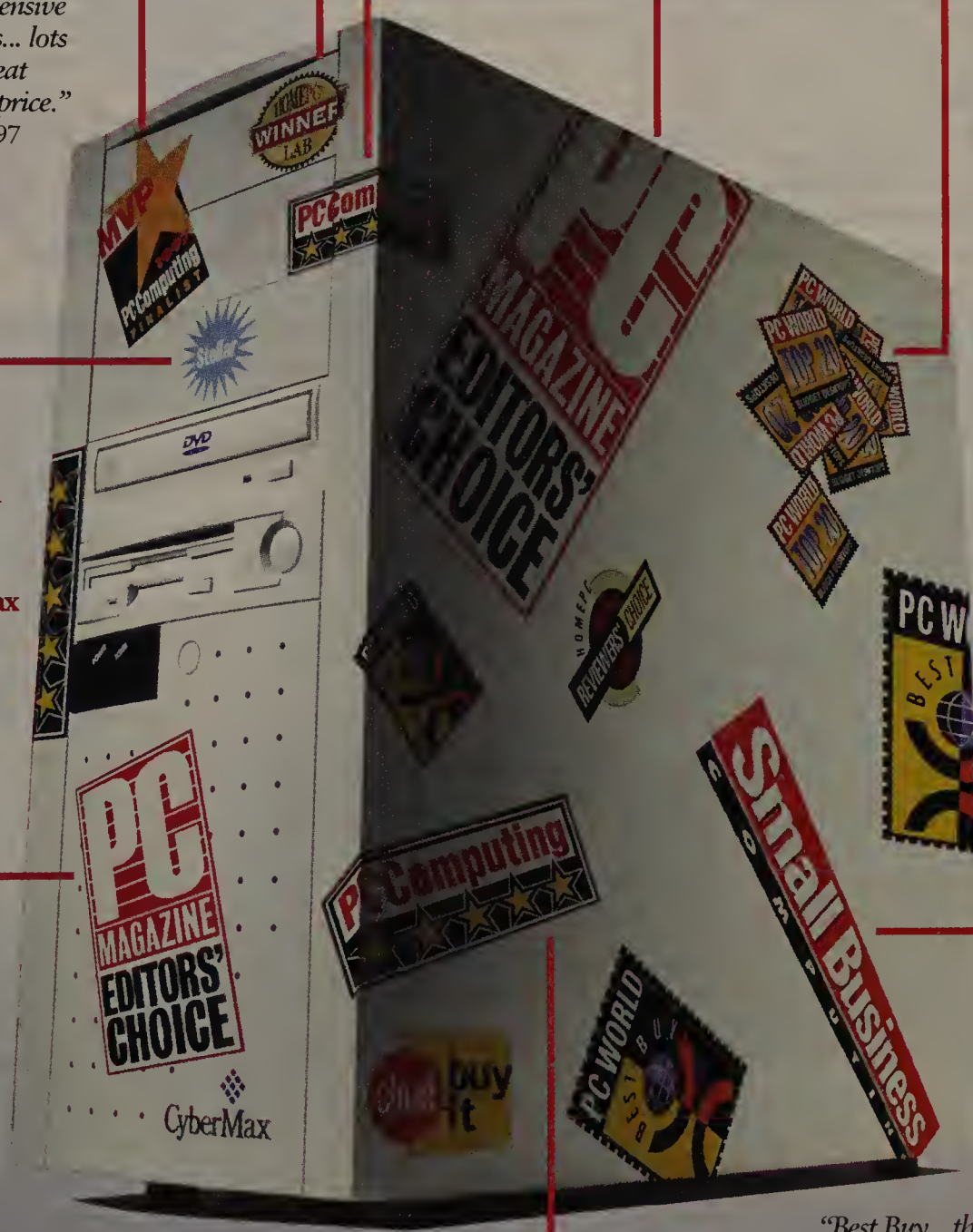
"PowerMax outpaced Dell's... Dimension XPS... the PowerMax makes an excellent bridge for that long migration to Windows® NT... tremendous bang for the buck."
- PC Computing MVP Finalist
Fall Comdex 1997

"The Max C6 233... earns our Editors' Choice because it offers the best balance of price, performance and features."
- PC Magazine: Editors' Choice September 1997

"The Max C6 233... stacks up well against those of the more expensive Pentium II 266 MHz systems... lots of room for expansion... a great balance of performance and price."
- Windows Stellar September 1997

"AMD's K6 chip strikes again, this time inside the multimedia wise CyberMax PowerMax, a Best Buy for the third month. Multimedia enthusiasts and game players will want to take a close look at this sturdy and expandable bargain-price tower."
- PC World Best Buy
February 1998

To win this system and learn more about the new AMD-K6-2 "The Smart Choice for 3D" visit **www.games.net/CyberMax**



"... an incredible bargain... ideal for the cost-conscious yet demanding SOHO user... the PowerMax was nothing short of a great performer, it achieves such status without sacrificing a thing."
- PC Magazine Editors' Choice Award June 1997

"CyberMax's PowerMax delivers faster performance... for hundreds less."
- PC Computing 5 Star Award June 1997

"Best Buy... the CyberMax 6x86MX, an admirably well-rounded machine with a bargain basement price."
- Small Business Computing November 1997

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Business Software

Best PIM: Lotus Organizer 97 GS; Best Utility: Nuts & Bolts

Best Operating System
Microsoft Windows 95

It's not perfect, but for now more software and peripherals are available for Windows 95 than for any other OS, a key advantage to most users. While Windows 98 will offer refinements, the oft-delayed Windows NT 5.0 is likely to be Win 95's heir. • **Microsoft,** 800/426-9400, www.microsoft.com

READER SERVICE NO. 761

Best Application Suite
Microsoft Office 97

Office 97 has taken its share of knocks—for everything from file-format hassles to silly cartoon-character help. Still, this suite boasts the strongest lineup—Word and Excel are tops in the two most important categories. Office comes in versions for everyone from home users to small business owners. Prices range from $499 to $799. • **Microsoft,** 800/426-9400, www.microsoft.com

READER SERVICE NO. 762

Best Word Processor
Microsoft Word 97

The race among the big three word processors is close, but Word maintains an edge. First-rate editing, extensive customization, and the best Web-page creation help make it our top choice for word-slinging. It's $339 in stand-alone form. • **Microsoft,** 800/426-9400, www.microsoft.com

READER SERVICE NO. 763

Best Spreadsheet
Microsoft Excel 97

Microsoft Office's spreadsheet (available separately for $339) retains a narrow but noticeable lead over Lotus 1-2-3 and Corel Quattro Pro. It impresses us with snazzy tools for tracking changes and dressing up data with fancy formatting. • **Microsoft,** 800/426-9400, www.microsoft.com

READER SERVICE NO. 764

Best Database Software
Microsoft Access 97

Creating a database and extracting data aren't so hard with Access 97. Its querying tools feature the most options, and its on-screen help is a godsend. We especially like the way this $339 product integrates with other Office apps and with the Web. • **Microsoft,** 800/426-9400, www.microsoft.com

READER SERVICE NO. 765

Best Personal Information Manager/ Contact Manager
Lotus Organizer 97 GS

The spiral-bound interface of the $79 Organizer GS is ideal for anyone making the move from a paper planner. Simple linking options let you cross-reference a calendar, address book, and other data. • **Lotus,** 800/353-5414, www.lotus.com

READER SERVICE NO. 766

Runner-up: GoldMine 4.0. Tight-knit teams of salespeople will thrive on this $169 contact manager's forecasting, telemarketing, and project management. • **Goldmine Software,** 800/654-3526, www.goldminesw.com

READER SERVICE NO. 767

Best Utility Software
Network Associates Nuts & Bolts

Peter Norton's famous tool kit has met its match in the $49 Nuts & Bolts. Cheaper than Norton Utilities, it's a top-notch set of essential tools, including some that Peter left out. • **Network Associates,** 408/988-3832, www.nai.com

READER SERVICE NO. 768

Runner-up: Mijenix PowerDesk Utilities 98. A huge improvement on Windows' Explorer, this $40 software has what you need to manage all your files. • **Mijenix,** 800/645-3649, www.mijenix.com

READER SERVICE NO. 769

Most Promising Software Newcomer

Dragon NaturallySpeaking

ADMIT IT. You've chuckled at the idea of talking to your PC. "Open document, take a letter, don't give me any lip." And until recently, the ribbing was well deserved. But NaturallySpeaking from Dragon Systems has turned voice recognition from a joke into a viable way of interacting with your PC. It uses continuous speech recognition so you can talk at a normal pace instead...of...like...this. We found the program so accurate, using it was a bit scary—in a *2001: A Space Odyssey* kind of way.

Mind you, an innovative tool like this isn't cheap, nor is using it a walk in the park. The Deluxe version costs $695. It lets you dictate into almost any application and gives you the best recognition. (More spartan versions cost $109 to $229.) To get it working its best, you must spend time training the software to recognize your voice. You may feel a little silly reading stories to your PC, but the quality time you spend now will mean higher productivity later.

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SL90. MORE MONITOR. MORE WORK SPACE.

Introducing the SL90, the 19" class monitor with a 15" footprint. Panasonic made the space-saving design the competition could not produce. While other 19" class monitors have the depth of a 17", the SL90 is the first to fit comfortably in the space of a 15". The result, more working area on your screen *and* your desk!

But the SL90 doesn't stop short when it comes to performance. You still get incredible picture quality, up to 1600 x 1280 resolution and an eye-saving 95Hz refresh rate. Still tight on space? Panasonic also offers the SL70, a 17" class monitor with the footprint of a 14".

Model	SL90	SL70
Dot Pitch (mm)	0.25	0.27
Max. Res. (H X V)	1600 X 1280	1280 X 1024
H-Scan (kHz)	30 - 95	30 - 70
Viewable Area	18.0"	16.0"

And, we don't stop short when it comes to support either. We've got you covered with the most extensive warranty and customer support program in the industry, including a 3-Year Warranty, On-Site Swap and Toll-Free Hotline. You simply won't find anything better than it.

Check out the PanaSync™ SL90 and SL70 Short Length Monitors today. For more information, and the Panasonic Dealer near you, call 1-800-742-8086 ext. MN34 or visit our website at www.panasonic.com/displays.

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Best Antivirus Software
Symantec Norton AntiVirus 4.0
Okay Peter, stand proud again. Your $50 antivirus program outperformed all the other packages we tested at finding and eliminating viruses. Using it is simple, but it comes with good docs anyway. • **Symantec,** 800/441-7234, www.symantec.com
READER SERVICE NO. 770

Runner-up: Inoculan AntiVirus for Windows 95. Like NAV 4.0, this $40 app was near perfect at rooting out viruses and has an intuitive interface. • **Computer Associates,** 800/424-3936, www.cai.com/cheyenne/desktop
READER SERVICE NO. 771

Best Accounting Software
Peachtree Complete Accounting Plus Time and Billing
One of the best things about Peachtree's $249 multiuser accounting package (now version 6.0) is the ease with which it lets you customize reports. It also wins points for its time and billing modules. • **Peachtree Software,** 800/228-0068, www.peachtree.com
READER SERVICE NO. 772

Runner-up: QuickBooks Pro. It doesn't have all the tools that Peachtree does, but this $199 program, designed for one user, is ideal for a home-based business. • **Intuit,** 800/446-8848, www.intuit.com

Graphics Software

Best Graphics: CorelDraw 8, Visio 5.0, and Bryce 3D (clockwise from top)

Best Presentation Graphics Software
Lotus Freelance Graphics 97
Whether for transparencies or a Web show, no package provides more help (part of SmartSuite, or on its own for $339). • **Lotus,** 800/353-5414, www.lotus.com
READER SERVICE NO. 773

Best Business Graphics Software
Visio 5.0
Drag-and-drop editing and intuitive tools make this do-it-all the best in its class. It's $149 for the Standard version. • **Visio Corp.,** 800/248-4746, www.visio.com
READER SERVICE NO. 774

Runner-up: Micrografx Graphics Suite 2.0. FlowCharter 7 is a jewel for creating diagrams. The $350 suite also comes with software for the artist in you, including Picture Publisher and Simply 3D. • **Micrografx,** 800/733-3729, www.micrografx.com
READER SERVICE NO. 775

Best Desktop Publishing Software
Adobe PageMaker 6.5
Adobe PageMaker effortlessly switches between desktop publishing and online electronic publishing. But keep in mind: With a steep $550 price and a steeper learning curve, it's really for pros. • **Adobe Systems,** 800/422-3623, www.adobe.com
READER SERVICE NO. 776

Runner-up: Microsoft Publisher 98. It's just $99 and designed so anyone can use it. With wizards to help you create everything from business cards to Web pages, Publisher 98 is best for individuals and small businesses. • **Microsoft,** 800/426-9400, www.microsoft.com
READER SERVICE NO. 777

Best Draw Software
CorelDraw 8
Corel's $480 flagship product is filled with fonts, photos, clip art, 3D graphics software, a photo editor, and more. Version 8 adds Web features, a more customizable interface, and nice wizards. • **Corel,** 800/772-6735, www.corel.com
READER SERVICE NO. 778

Runner-up: Micrografx Windows Draw 6.0 Premiere Edition Print Studio. When it comes to bang-for-the-buck, this $50 draw package has no peer. • **Micrografx,** 800/733-3729, www.micrografx.com
READER SERVICE NO. 779

Best Image/Photo Editing Software
Adobe Photoshop 5.0
The $699 Photoshop is still the choice for making image magic. It works best on a powerful PC. • **Adobe Systems,** 800/492-3623, www.adobe.com
READER SERVICE NO. 780

Runners-up: Adobe PhotoDeluxe 2.0 and Micrografx PhotoMagic 6.0. These powerful, easy-to-use apps cost $49 each. • **Micrografx,** 800/671-0144, www.micrografx. com
READER SERVICE NO. 781

Best 3D Graphics Software
MetaCreations Bryce 3D
Whether or not you're an artist, the $199 Bryce 3D is an affordable way to create realistic scenes. • **MetaCreations,** 800/846-0111, www.metacreations.com
READER SERVICE NO. 782 ▶

Support and Mail Order

ONLY CONSUMERS can tell us who provides the best support and service. So we surveyed a random sample of 350 *PC World* readers. In the mail-order category, Dell and Gateway trounced traditional catalog companies, in part because Dell and Gateway sell more than just PCs.

Best Hardware Support
Dell, Gateway (tie); **Runner-up:** Hewlett-Packard

Best Software Support
Microsoft; **Runner-up:** Intuit

Best Computer Mail-Order Company
Dell, Gateway (tie)

"Finding color printers that fit our needs is my number one goal."

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Optra Color SC 1275

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FINALLY. A HIGH-RESOLUTION FLOPPY DISK-COMPATIBLE CAMERA.

GET THE NEW FLASHPATH™ FLOPPY DISK ADAPTER FREE WITH THE PURCHASE OF THE AWARD-WINNING OLYMPUS D-320L DIGITAL CAMERA.*

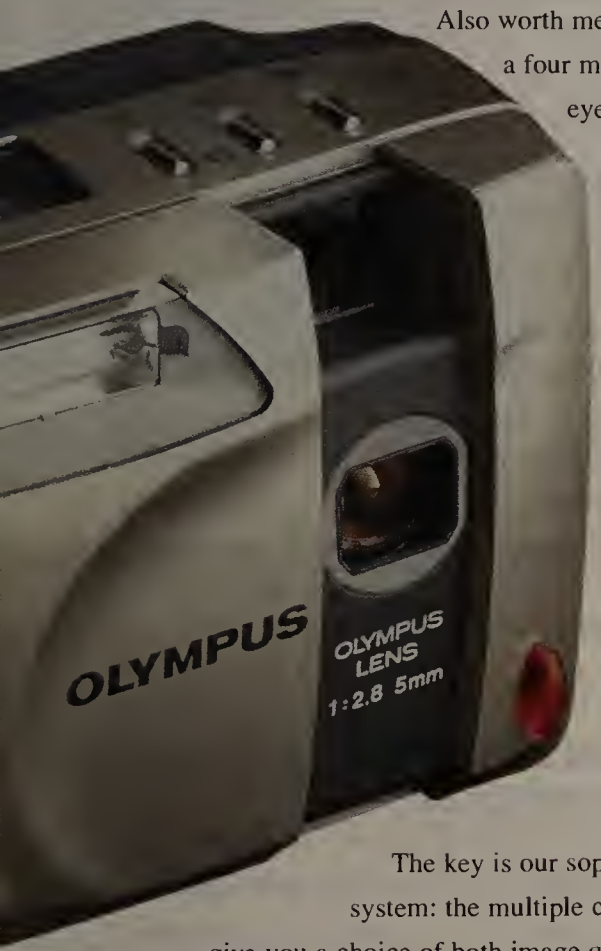
* OFFER GOOD THROUGH JUNE 30, 1998

THE BEST GETS BETTER

People know the value of a great digital camera like the Olympus D-320L. After all, it's won numerous awards. For both performance and design. Now, at its new low price, the D-320L becomes an even greater value. And, for a limited time*, the revolutionary new FlashPath floppy disk adapter is free with the purchase of the D-320L.

WAY OUT FRONT

Let's begin with the optics that give Olympus its renown. Here the D-320L exceeds beyond all counts. It has a five element all glass aspherical F2.8 autofocus lens with macro. Quitc simply, this lens is equal to the lenses on our award-winning 35mm cameras. Put another way, this digital camera consistently produces higher quality images than other digital cameras, even some with higher resolution.



Also worth mentioning: a four mode flash with red-eye reduction; auto white balancing; and manual exposure controls.

WE WORK OUR PIXELS HARDER THAN ANYONE ELSE

Our resolution: never produce a high resolution camera without giving the pixels something to do. Our resolution is 1024 x 768 pixels and all 810,000 of them have plenty to keep them occupied.

The key is our sophisticated imaging system: the multiple compression ratios that give you a choice of both image quality and size as well as the color management system that rewards you with rich, vibrant images. The result: every one of our pixels earn their keep.

SHOOT, SHOOT, SHOOT

There are no restrictions on the number of photos you can capture with the D-320L. The 2 megabyte SmartMedia™ card that comes with the camera (4 or 8MB optional) has an unlimited capacity.

You just simply download the images from the card to your computer by means of the serial cable or the optional PCMCIA or 3.5" floppy disk adapters. Or you can insert a new card anytime and keep on shooting.

REVOLUTIONARY FLASHPATH™ FLOPPY DISK ADAPTER

The new FlashPath adapter lets you download images and transfer large files directly to any Windows® computer via its standard 3.5 inch floppy drive. Simply remove the SmartMedia memory card from the D-320L, slip it into the FlashPath adapter and insert it into the 3.5 inch floppy drive. In seconds, your images can be transferred to your PC.

NO COMPUTER NECESSARY

Hook up the D-320L to the TV and watch your shots come to life.

For those who don't want to be married to a computer day after day, there's emancipation. The D-320L has video output that directly hooks to your TV. The entire family can now view your shots without the need for a computer. And the images can be videotaped on a VCR and sent to relatives or business associates.

Another direct connection is from the camera to the new Olympus P-300 personal photo printer. In a little over a minute you can print true photo quality images directly from the camera. Finally, digital independence!

Connect the camera to our photo printer and presto! Get the photo you want, when you want it.

OUR REVEALING BACK

It tells you a lot. For one thing, there's the new 2" screen that displays real images in brilliant color. You can use it as a viewfinder or to review your shots one at a time or nine at a time. Or use it to present a slide show by automatically displaying each image one at a time. And if stop action inspires you, the D-320L can capture 9 shots per second in a single frame.

A FINAL BYTE

So purchase a new D-320L Digital Camera by June 30, 1998 and get a FlashPath Floppy Disk Adapter for free. And start enjoying downloading high resolution camera images with floppy disk convenience. For more information on Olympus Digital Products visit us at www.olympus.com/digital. Or call us at 1-800-622-6372 and we'll answer all your questions.

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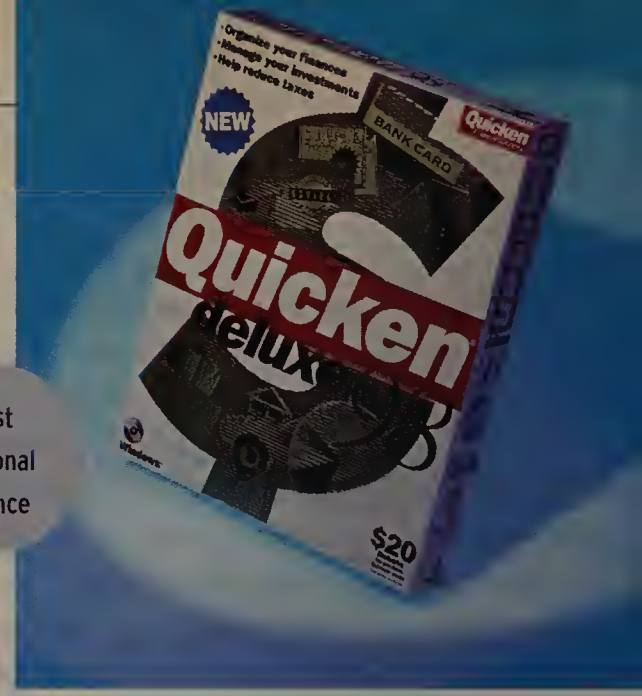
Personal Software



Best Personal Finance

Best Personal Finance Software
Quicken Deluxe 98

Quicken or Money? Both let you handle your finances with flair, but we prefer Quicken's traditional interface to Microsoft Money's Webbish one. And Quicken Deluxe ($60) is just as Net savvy. Its embedded browser will fire up on demand and download information from Quicken.com. • **Intuit,** 800/446-8848, www.intuit.com

Best Tax Software
Intuit TurboTax

TurboTax remains the leader in tax preparation. The Deluxe edition ($50) features multimedia hand-holding and free electronic filing, while TurboTax for Business ($70) has additional publications, forms, and help for your more-complicated filings. • **Intuit,** 800/446-8848, www.turbotax.com

Best Voice Recognition Software
Dragon NaturallySpeaking

Voice recognition software is like a good shrink—you have to pay a little extra if you want it to listen carefully. NaturallySpeaking is the best at translating continuous speech into text. But the top-of-the-line edition costs $695 (lesser versions cost $109 to $229). • **Dragon Systems,** 800/825-5897, www.naturalspeech.com

READER SERVICE NO. 783

Best Shareware
WinZip 6.3

For pure utility, no shareware rivals Nico Mak's $29 WinZip 6.3. It's indispensable for anyone who shares files. We like its snappy interface and its ability to unzip virtually every esoteric format floating around the Web. • **Nico Mak Computing,** www.winzip.com

Internet

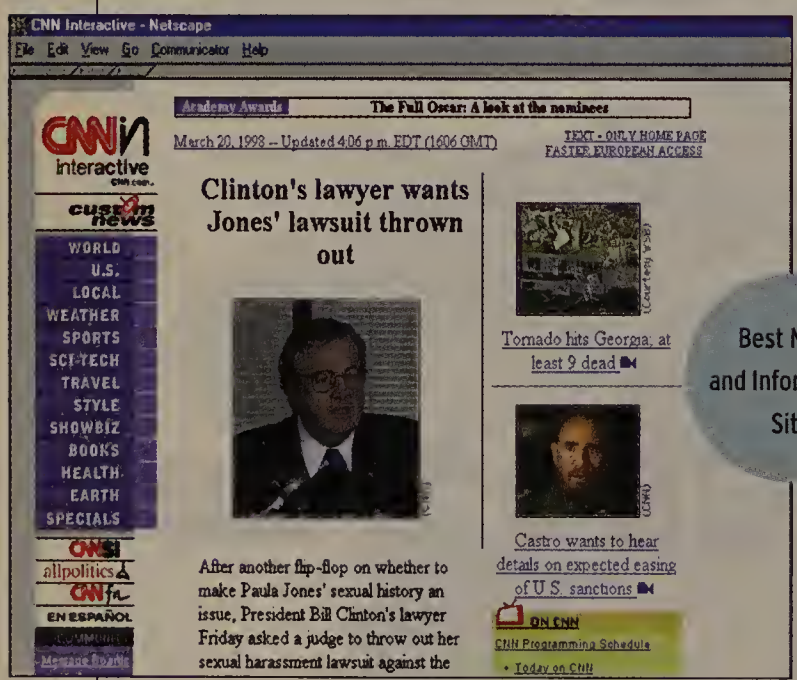
Best Internet Service Provider
MindSpring

This onetime regional ISP has grown up—all the while serving its users with a smile. Performance continues to improve, but it's hard to improve on what readers tell us is the best support in the business. • **MindSpring,** 800/719-4660, www.mindspring.com

READER SERVICE NO. 785

Runner-up: EarthLink Network. It has access numbers all over the country and online gaming to boot. And like MindSpring, it leapfrogs IBM Internet Connection, which has scaled back its unlimited usage plan and doesn't provide Web hosting for individuals. • **EarthLink Network,** 800/395-8425, www.earthlink.net

READER SERVICE NO. 786



Best News and Information Site

Best Web Browser
None

Opera's browser had a better year than the Big Two (see "Most Promising Web Newcomer"). But a free browser is still the best browser.

Runners-up: Microsoft Internet Explorer 4.x and Netscape Navigator 4.x. They're too buggy to be winners. Just be sure to download the latest (fixed) versions from their Web sites.

- **Microsoft,** www.microsoft.com
- **Netscape,** www.netscape.com

Best E-Mail Software
Microsoft Outlook Express

Part of IE 4.*x*, Outlook Express is by far the best of Microsoft's numerous forays into e-mail. With a simple interface and tools for taming a full in-box, this free package is perfect for both neophytes and pros. • **Microsoft,** 800/426-9400, www.microsoft.com

READER SERVICE NO. 787

Best Web Authoring Tool
Microsoft FrontPage 98

With this version, Microsoft's $149 package becomes top dog. Its rich features for creating text, graphics, and other Net content include something for almost everyone. • **Microsoft,** 800/426-9400, www.microsoft.com

READER SERVICE NO. 788

Best Internet Utility
WS-FTP Pro 5.0

This $38 drag-and-drop utility makes moving files around the Web as easy as navigating your hard disk. • **Ipswitch,** www.ipswitch.com

Runner-up: Cookie Crusher 1.6. With this $15 tool, you can decide which sites you'll accept cookies from. • **The Limit Software,** www.thelimitsoft.com

Best Internet Plug-in
RealPlayer 5.0

The free plug-in handles streaming audio, plus RealVideo and RealFlash animation. A $30 Plus version adds a cool software interface, with preset buttons like on a car radio, along with other features. • **RealNetworks,** www.real.com ▶

EO SERIES

IMPROVE YOUR VIEW OF THE WORLD.

Introducing the EO710 17" (15.95" viewable) monitor from Princeton.

Princeton creates monitors that improve the way you work, as well as your view of the world. In fact, the more you demand, the more Princeton delivers. The **EO710 is designed smart with a sleek, space-saving shell** and plenty of features, including an **Advanced High Contrast CRT** for greater image definition and three-dimensional clarity. Our Ultra Fine Dot Pitch of .26mm produces a clear and crisp image. And the **high maximum resolution** of 1280x1024 (1024x768 at 85Hz recommended) provides outstanding flicker-free performance. There's even an **Autosetup feature** to make setup as easy as touching a button. The EO710 is TCO compliant and exceeds the most stringent emissions/safety standards. You can depend on Princeton with our **full 3-year warranty on parts, labor and CRT,** plus a **48-hour exchange program** on all EO Series monitors. At Princeton our vision is clear; we've been making performance affordable for over 20 years.

You'll find Princeton's innovation in a full line of EO Series products.

Model	CRT	Viewable	Dot Pitch-Type	Max Res (H)	Max Refresh
EO500	15"	13.9"	0.28mm - High Contrast	1280	120Hz
EO700	17"	15.95"	0.28mm - FST	1280	120Hz
EO710	17"	15.95"	0.26mm - High Contrast	1280	120Hz
EO720	17"	15.95"	0.26mm - MicroFilter™	1280	120Hz
EO90	19"	18.0"	0.26mm - High Contrast	1600	150Hz

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Circle 151 on reader service card.

The EO710 is the latest innovation in the award-winning Princeton product line.

CADALYST LABS 4 STAR RATING 1998 · PC WORLD TOP 10 MONITORS · WIN 100 W 1997 · Macworld EDITORS' CHOICE

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As an Energy Star℠ Partner, Princeton Graphic Systems has determined that this product meets Energy Star℠ guidelines for energy efficiency. Product features subject to improvement without notice.

Runner-up: Beatnik 1.2. It plays most audio formats but really shines when playing clips that use HeadSpace's high-quality Rich Music Format. • **HeadSpace,** www.headspace.com

Best Web Search Site
HotBot

Big search sites add features at a pace that's dizzying even for the Web. For now, HotBot is the most useful of the bunch, with a huge database of links to sites, newsgroups, and other Net content—plus a powerful point-and-click interface. • **HotBot,** www.hotbot.com

Runner-up: Yahoo. The biggest name in search sites is also one of the best, with a huge directory and built-in access to AltaVista's first-rate search engine. • **Yahoo,** www.yahoo.com

Best News and Information Site
CNN Interactive

From the folks who brought you the Gulf War comes the Web's most complete news source. Daily news and features are complemented by CNN's politics, business, and sports coverage. (IDG, parent company of *PC World*, recently formed an online partnership with CNN Interactive.) • **CNN Interactive,** www.cnn.com

Best Shopping Site
Amazon.com

There's no substitute for a real bookstore, but with its great prices, selection, and advice, Amazon.com is online shopping at its best. • **Amazon.com,** www.amazon.com

Best Recreational Site
ESPN SportsZone

Scores, statistics, and up-to-the-minute news make this the site of choice for the serious sports fan. • **ESPN SportsZone,** www.espn.com

Networking

Best Network OS (top) and Best Group Application

Best Network Server
Hewlett-Packard NetServer Series

HP offers fast and reliable Intel-based servers backed by a suite of management tools and first-class support. The NetServer E line includes nice features for small businesses that don't have computer professionals on hand. • **Hewlett-Packard,** 800/752-0900, www.hp.com

READER SERVICE NO. 789

Best Network Operating System
Windows NT Server 4.0

Windows NT has bolstered its lead over NetWare by bundling Internet Information Server 4.0 (an excellent Web server) and other Net goodies. Pricing starts at $809 for five clients. • **Microsoft,** 800/426-9400, www.microsoft.com

READER SERVICE NO. 790

Best Group Application
Instinctive Technology ERoom

Now in version 2.0, ERoom lets you create project workplaces for sharing documents, holding discussions, and doing other tasks. And it works right out of the box. A standard version costs about $99 per user, or you can rent ERoom for $25 per user per month at www.ca-nethaven.com. • **Instinctive Technology,** www.instinctive.com

READER SERVICE NO. 791

Best Workgroup Printer
Xerox DocuPrint C55mp

The best color printer for a network doesn't come cheap. But the $4500 DocuPrint C55mp is a great deal, with a bundled $500 ethernet card and a whopping 30MB of RAM to manage any workload. It produces great-looking documents and prints at high speed. • **Xerox,** 800/349-3769, www.xerox.com

READER SERVICE NO. 792

Runner-up: HP LaserJet 4000 TN. If all you need is a monochrome workgroup printer, this $1599 model is the right call. It holds 600 sheets, and you can count on great text quality. • **Hewlett-Packard,** 800/527-3753, www.hp.com

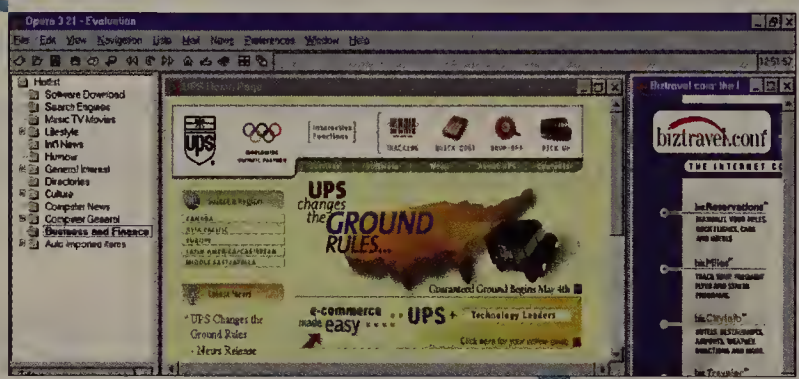
READER SERVICE NO. 793 ■

Most Promising Web Newcomer

Opera 3.21

TIRED OF BLOATED BROWSERS? Still using a 486? Then turn your back on Microsoft and Netscape and head to the Opera—the Opera Web browser. Developed in Norway, this little browser is just a 1.1MB download (as opposed to the 9MB to 25MB those other browsers demand). Minimum system requirements are a 386SX processor, 6MB of RAM, and 1.2MB of disk space.

Opera is a contender in the browser wars. Version 3.0 introduced support for JavaScript and SSL 2 and 3 security, plus a hot-list feature, similar to bookmarks. Opera is fast, but it's not immune from bugs, which is why the company is already on version 3.21. And unlike the Big Two, Opera isn't free—it costs $35. But Opera may prove Netscape wrong: You *can* charge for a browser, if it gives users what they want—fast, no-nonsense Web surfing. • **Opera Software,** www.operasoftware.com



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Spot the new Sony notebook.

Order it direct from Sony and get:

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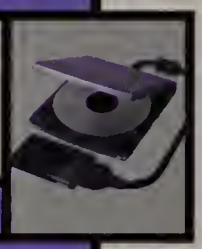
- 24-hour, 7-days-a-week technical support for Sony PC systems
- Special financing options available*
- One-year parts and labor (upon registration; 90 days w/out registration) (certain restrictions apply)
- 90 days phone support on all bundled software

Order either notebook and get a free port replicator.
(A $99.99 value)

CD-ROM drive

Slim, color-coordinated 14X CD-ROM drive for serious multimedia capability. Or listen to CDs with headphones.

PCGA-CD5: $299.99



AC adapter

Just plug it into your VAIO 505 SuperSlim Notebook and forget all your concerns about battery life.

PCGA-AC51: $99.99

Rechargeable battery pack (large)

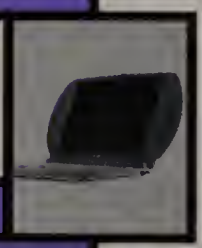
Double the time you can spend on your SuperSlim Notebook with this double capacity Lithium ion battery.

PCG-BP52: $299.99

Stereo speakers

Just clip these speakers on both sides of the display panel for enhanced sound performance.

PCGA-SP5: $99.99



Free stereo speakers when you pre-order GX model and CD-ROM drive.
Call for more details. Offer expires July 24, 1998.

The new Sony VAIO® 505 SuperSlim Notebooks.

Here are the answers to some frequently asked questions about the new Sony VAIO 505 SuperSlim Notebook:

Microsoft® Windows® 98 pre-installed

Yes, it really is that slim.

Yes, it really does weigh that little.

Yes, we promise.

Yes, it really does feel like using a regular size notebook.

Yes, even the keyboard.

Yes, we did say "Intel® Pentium® processor."

Yes, you heard right. There is also a 266 MHz model.

No, actually it looks even better in real life.

MMX™ intel inside pentium® PROCESSOR

And yes, it really can do whatever you need it to—every bit as capably as other notebooks in the same price range.

If you have any more questions, visit our Website or call us toll-free today and talk to a friendly Sony expert about the VAIO 505 SuperSlim Notebooks, and all the other Sony products designed to work with it. Reserve yours now to guarantee delivery.

PCG-505GX

- 266 MHz Intel Pentium processor with MMX™ technology
- 10.4" active matrix SVGA display (800 x 600 resolution)
- 32 MB SDRAM (expandable to 64 MB)
- 2.1 GB hard drive
- K56flex™ Data/Fax modem (software upgradeable)§
- 128-bit graphics accelerator
- Programmable power key
- Touch pad with pen operation
- i. Link (IEEE-1394) port for digital video capture∆
- Price includes accessories: AC adapter, rechargeable battery, floppy disk drive, port replicator

$2,699.99 Monthly payments as low as $49.95*

§33.6 Data/14.4 Fax modem with K56flex™ technology
∆Requires Sony digital video camcorder

PCG-505G

- 200 MHz Intel Pentium processor with MMX technology
- 10.4" active matrix SVGA display (800 x 600 resolution)
- 32 MB SDRAM (expandable to 64 MB)
- 2.1 GB hard drive
- K56flex Data/Fax modem (software upgradeable)§
- 128-bit graphics accelerator
- Price includes accessories: AC adapter, rechargeable battery, floppy disk drive, port replicator

$1,999.99 Monthly payments as low as $37.00*

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It's like thin air with an Intel® Pentium® processor.

Under 3 pounds.

Tough, lightweight magnesium-alloy shell.

10.4" LCD screen.
90% size keyboard with touchpad.

Less than 1 inch thick.

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Introducing Sony VAIO® Notebooks.

- 233 MHz Intel® Pentium® processor with MMX™ technology
- 12.1" SVGA HPA LCD display
- 64 MB SDRAM (expandable to 128 MB)
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- Removable 2.1 GB hard drive
- Removable CD-ROM drive
- K56flex™ Data/Fax modem (software upgradeable)§
- Windows 98 plus 25 software titles
- One-year parts and labor (upon registration; 90 days w/out registration) (certain restrictions apply)

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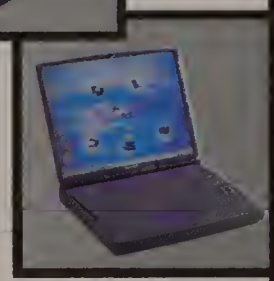
VAIO Notebook PCG-731

- 200 MHz Intel Pentium processor with MMX technology
- 12.1" SVGA HPA LCD display
- 32 MB SDRAM (expandable to 128 MB)
- Slim (1.5") and lightweight (5.75 lb.)
- Removable 2.1 GB hard drive
- Removable CD-ROM drive
- K56flex Data/Fax modem (software upgradeable)§
- Windows 98 plus 25 software titles
- One-year parts and labor (upon registration; 90 days w/out registration) (certain restrictions apply)

$1,799.99 Monthly payments as low as $33.30*



Extra-Wide Screen

90 days free Internet access
No credit card required
(maximum two hours per day, up to 50 hours total)

VAIO Notebook PCG-808

- 266 MHz Intel Pentium II processor
- 13.3" XGA TFT LCD display
- 64 MB SDRAM (expandable to 128 MB)
- Slim (1.5") and lightweight (5.75 lb.)
- Removable 4 GB hard drive
- Removable CD-ROM drive
- K56flex Data/Fax modem (software upgradeable)§
- Windows 98 plus 25 software titles
- One-year parts and labor (upon registration; 90 days w/out registration) (certain restrictions apply)

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Introducing new Sony MicroTowers.

VAIO MicroTower PCV-E205 with CPD-220VS

VAIO MicroTower PCV-E205

- 333 MHz Intel Pentium II processor
- 64 MB SDRAM (expandable to 256 MB)
- 8.4 GB hard drive
- 5X DVD-ROM/24X CD-ROM (max. performance)§§
- Advanced 3D graphics hardware accelerator (Ati 3D Rage Pro Turbo)
- 4 MB SG video RAM
- Includes Windows 98 and popular software pre-installed

17" Display (16" VIS) CPD-220VS

- Integrated stereo speakers and subwoofer for dynamic 3D sound
- Graphic Picture Enhancement (GPE) with four modes for 3D games, MPEG video, photographs or standard presentation use
- Digital Multiscan® Technology that supports a maximum resolution of 1280 x 1024 @ 60 Hz

$2,399.99 Monthly payments as low as $44.40*

VAIO MicroTower PCV-E203 with CPD-120VS

VAIO MicroTower PCV-E203

- 300 MHz Intel Celeron™ processor
- 48 MB SDRAM (expandable to 256 MB)
- 6.4 GB hard drive
- 5X DVD-ROM/24X CD-ROM (max. performance)§§
- Advanced 3D graphics hardware accelerator (Ati 3D Rage Pro Turbo)
- 4 MB SG video RAM
- Includes Windows 98 and popular software pre-installed

15" Display (13.9" VIS) CPD-120VS

- Integrated stereo speakers and subwoofer for dynamic 3D sound
- Graphic Picture Enhancement (GPE) with four modes for 3D games, MPEG video, photographs or standard presentation use
- Digital Multiscan Technology that supports a maximum resolution of 1280 x 1024 @ 60 Hz

$1,699.99 Monthly payments as low as $31.40*

VAIO MicroTower PCV-E201

- 266 MHz Intel Celeron processor
- 32 MB SDRAM (expandable to 256 MB)
- 4.3 GB hard drive
- 24X CD-ROM (max. performance)§§
- Advanced 3D graphics hardware accelerator (Ati 3D Rage Pro Turbo)
- 2 MB video memory (SGRAM)
- Includes Windows 98 and popular software pre-installed

$999.99 Monthly payments as low as $18.50*

Microsoft® Windows® 98 pre-installed

MMX™ intel inside pentium® PROCESSOR

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SONY

Godzilla-Size HARD DRIVES

BY STAN MIASTKOWSKI

The bad news: Enormous Windows applications gobble up your gigabytes. The good news: Huge hard drives are cheap, easy to install, and pack at least 5.2GB.

HARD DRIVES are getting so big they're almost scary. Who really needs 8 gigabytes of storage, much less one of those gargantuan 14GB drives that are shipping with Pentium II 350- and 400-MHz PCs these days? If you don't use your PC for more than a few basic applications, anything beyond 2GB is overkill. But then again, lots of people can argue that in terms of hard drive space, more is better. Consider, for example, Windows 98. Microsoft's latest operating system could consume 170MB—more than

PHOTOGRAPHS BY JOHN KUCZALA

twice the real estate Windows 95 occupies. Also, if you regularly push your storage capacity to the limit by editing photographs or downloading video clips from the Web, it's worth looking into an upgrade. And you might as well make the upgrade a big one: Why buy a new 4GB hard drive for around $150 when you can get a 6.4GB drive for just $50 more?

We installed and performance-tested 13 EIDE hard drives from Fujitsu, IBM, Maxtor, Quantum, Seagate, and Western Digital, ranging in size from 5.2GB to 12GB and costing from $199 to $399. We also tested the performance of (but didn't install) 4 EIDE models currently available only in brand-new PCs: Quantum's 8.4GB Fireball SE 8.4, Seagate's 9.1GB Medalist Pro 9140, and IBM's huge new 14.4GB Deskstar 14GXP and 16.8GB Deskstar 16GP. We didn't include SCSI drives because for most people, the performance boost SCSI provides isn't worth the hassle and expense. They're more difficult to install than EIDE models, and cost 30 to 50 percent more for the drive and $100 to $200 extra for a separate add-in controller.

Our findings? Although our Best Buys—Seagate's 6.4GB Medalist Pro 6451 and Maxtor's 8.4GB DiamondMax 2160—have a slight edge over the pack, just about any hard drive kit we tested is worth buying. Widely available by mail order or from local discount computer stores, upgrade kits typically contain everything you need for a painless upgrade: installation software (either on a disk or downloadable from a Web site), mounting brackets, and instructions. Anyone with some PC experience should be able to install a kit hard drive—even the behemoths—in 2 to 4 hours.

Beginners should probably stay away from the two Fujitsu drives we evaluated—the MPB3064AT and MPB3052AT. They are sold alongside other kits but lack the manuals and mounting hardware that the others have. Bare-bones drives like these can save you money if you're an old hand at hard drive installation and you're buying in volume. But if you've never installed a drive, do yourself a favor and buy a kit. The Fujitsu drives come with only a sliver of the documentation you get with other kits and don't include drive rails.

The Fireball SE 8.4, Medalist Pro 9140, and the two Deskstar drives should be available in kits by year's end. In the meantime, any of these four drives is worth asking for if you're buying a new PC. Dell, Gateway, and Micron offer them on their new systems. These cutting-edge drives consistently outperformed all the other drives in our file copy, file search, and video capture tests, thanks to some clever new technologies: The two IBM drives, endowed with new Giant Magneto-Resistive drive heads, cram data more densely than other models. Quantum's Fireball SE and IBM's Deskstar 14GXP drives spin at 7200 rpm, speeding up the

HARD DRIVE SCORECARD

Is a Hard Drive Just a Hard Drive?

THE BIG QUESTION: How do you tell one hard drive kit from another if all of the drives perform similarly? The cost per gigabyte is what most people look at first when shopping for a hard drive, but other (often overlooked) factors can be just as important. Features such as the amount of phone support offered, the quality of Web support, and the manual that accompanies a drive are often as critical as cost or performance. In ranking the drive kits and deter-

6.5GB OR SMALLER DRIVE [1]	Street price	Capacity (GB)	Cost per GB	Comments	Overall value	File performance	Video performance
Seagate Medalist Pro 6451 408/438-6550 www.seagate.com	$225	6.4	$35	Best installation software and documentation; instructions printed right on the drive.	very good	below average	average
Maxtor 6.4GB DiamondMax 2160 800/262-9867 www.maxtor.com	$229	6.4	$36	Good value, solid performer, great support reputation, complete and thorough installation poster.	very good	average	below average
IBM Deskstar 5 800/772-2227 www.us.pc.ibm.com	$270	6.5	$42	Expensive, difficult to find; best support policies.	very good	average	average
Quantum Bigfoot TX 6 800/624-5545 www.quantum.com	$199	6.0	$33	Lowest price on the chart; very sluggish performance, requires 5.25-inch drive bay.	good	below average	average
Western Digital Caviar AC 36400 800/832-4778 www.westerndigital.com	$229	6.5	$36	Better value than sibling AC 35100, with better combined file search and file copy scores.	good	average	worst
Western Digital Caviar AC 35100 800/832-4778 www.westerndigital.com	$209	5.2	$41	One of the most common retail kits is an average value with average performance; smallest drive tested.	good	average	average
Fujitsu MPB3064AT 800/626-4686 www.fujitsu.com	$250	6.4	$39	Slightly lower performance than MPB3052AT drive, but a better value; average overall value.	average	average	average
Fujitsu MPB3052AT 800/626-4686 www.fujitsu.com	$222	5.2	$43	Bare-bones drive is the most expensive by the gigabyte; fast performer in the file copy test.	average	average	average
8GB OR LARGER DRIVE [1]							
Maxtor 8.4GB DiamondMax 2160 800/262-9867 www.maxtor.com	$279	8.4	$33	Great value with excellent support policies	very good	average	below average
Seagate Medalist Pro 8641 408/438-6550 www.seagate.com	$330	8.6	$38	Great performer, novice-friendly; expensive.	very good	average	average
IBM Deskstar 8 800/772-2227 www.us.pc.ibm.com	$310	8.5	$37	Excellent support policies; average price for this class of drives.	good	below average	average
Quantum Bigfoot TX 8 800/624-5545 www.quantum.com	$279	8.1	$35	Good value; performance lags near the bottom on some tests, requires 5.25-inch drive bay.	good	below average	average
Quantum Bigfoot TX 12 800/624-5545 www.quantum.com	$399	12.0	$33	Slowest overall performance of all drives tested, requires 5.25-inch drive bay.	good	slowest	average

Best Buy

[1] All drives listed in order of overall value.

rate at which data can be read off the drive platters. The slowest drives we tested were Western Digital's Caviar AC 36400, a 5400-rpm model that captured fewer than 15 frames per second out of a possible 30 fps in our video test, and Quantum's 4000-rpm Bigfoot TX drives, which were slowest at copying and searching for files.

THE OLDER PC

Worried that your PC won't be compatible with the latest hard drives? Relax. If your system was manufactured after 1993, you shouldn't encounter any problems. But even if you do, you'll probably find the answer easily in your kit's documentation or on your PC maker's Web site. Still, before tackling any hard drive upgrade, you should check the manufacturer's Web site for the most recent information. Some sites, like Seagate's and Western Digital's, offer outstanding support—better than the companies' phone support, which we found to be merely average.

There is, however, one compatibility issue to keep in mind: If you bought your PC before 1996, it may not take full advantage of your new drive's top speed. All the drives we tested except the Fujitsus use the latest high-speed interface, known variously as UltraDMA, UltraATA, or ATA-4. This interface offers a maximum transfer speed (also known as burst rate) of 33 megabits per second—twice that of ATA-3 drives like the Fujitsus. Only the newest PCs—usually those made in the past year—have ATA-4 support, which requires a motherboard with Intel's LX or TX chip set and BIOS.

To find out if your PC supports ATA-4, check the computer manual or open your BIOS setup program, where the type of hard drive support is usually shown in the peripherals section. If your PC doesn't qualify, it's not a big problem. All ATA-4 drives are backward compatible with older motherboards, but you'll be limited to a maximum transfer rate of 16.7 mbps—half the burst rate of optimal ATA-4 but still plenty for all common applications. The burst rate of a drive isn't critical for most real-world applications; you might notice a difference only if your hard drive were perfectly defragmented and you were reading long documents off it (the less fragmentation, the less the drive head has to search to read a file). If you really want that extra speed, though, you can get a PCI add-in ATA-4 card like Promise Technology's Ultra33 card for $60 to $80.

• **Ultra33**; $60 to $80 list; Promise Technology; 800/888-0245; www.promise.com

READER SERVICE NO. 635

UPGRADE WISDOM

Basic hard drive installation steps are the same whether you're installing a slim 5.2GB model or a 12GB titan. Set the jumpers on the new drive to master, install it in the place occupied by the old drive, adjust your PC's BIOS settings, partition and format the new drive, change the jumper settings on your old drive to slave and connect it to the same ribbon cable as the new one, and copy the complete contents of the old drive to the new one. Now, wasn't that a cinch?

It's easier than it sounds. To install a hard drive successfully, think like a Boy Scout: Be prepared. Follow the steps in the checklist "Things to Do Before and During Your Hard Disk Upgrade," and your installation should have a happy ending.

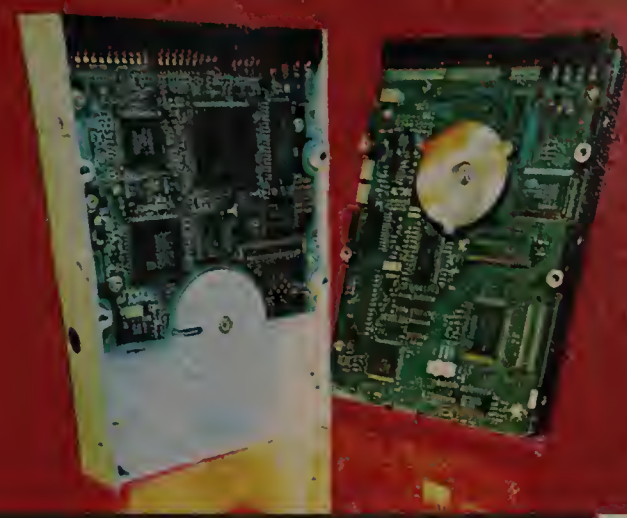
All hard drive kits use software that simplifies the process of copying your current drive's contents onto your new drive. Forget reinstalling Windows and all your applications. In most cases, reinstalling Windows opens a whole different can of worms. For the fastest, easiest upgrade, just use the software bundled with your new hard drive to copy everything over from the old one. Only a few circumstances warrant a fresh start. *PC World* columnist Steve Bass wrote about his ▶

BEST BUYS

Seagate and Maxtor Take Top Drive Honors

SEAGATE'S $225 6.4GB Medalist Pro 6451 is an outstanding general-purpose drive for novices. It comes with complete installation instructions, a great manual, a protective cover over the circuitry that prevents static damage (removed in the photo), and good Web support. Seagate's user-friendly DiscWizard installation software runs from Windows, so installation involves an additional step.

At $279, the Maxtor 8.4GB DiamondMax 2160 gives you two more gigabytes of space for $54 more than the Seagate. It's an average performer, but the upgrade kit includes an easy-to-read foldout poster that steers you through the installation process. Maxtor's stellar reputation for support is highlighted by its "No Quibble" replacement policy, which guarantees you a new drive in days.



NO-JIVE DRIVES Maxtor's 8.4GB DiamondMax 2160 (left) and Seagate's 6.4GB Medalist Pro 6451 pull ahead of the pack.

PHOTO: JOHN KUCZALA

mining their overall value for our hard drive scorecard (below), we considered ease of installation, documentation quality, and support—along with cost and performance.

Documentation	Support hours	Web site	Reader service number
very good	good	very good	611
very good	good	very good	612
very good	very good	good	–
good	good	good	613
very good	good	very good	614
very good	good	very good	615
below average	good	average	616
below average	good	average	617
very good	good	very good	618
very good	good	very good	619
very good	very good	good	–
good	good	good	620
good	good	good	621
		All products:	902

experience reinstalling everything last February in his column (www.pcworld.com/feb98/athome). If you're considering this option, give it a read.

JUMPING THROUGH JUMPERS

The first step in any hard drive upgrade is to physically remove the old drive and put in the new one (in the same drive bay if possible). Most PCs made since 1995 have two EIDE connectors on the motherboard, called the primary and secondary channels. They may each have a cable with two connectors. Your old drive is most likely attached to the first connector on the primary channel's cable, with its jumpers set to master—the only configuration that allows that hard drive to start your PC. Your goal: Use the same settings for your new drive.

Eventually, after you've formatted and partitioned the new drive, you'll add the old one back to the same ribbon, with its jumpers set to slave. But that comes later. For now, just remember that if any of the connectors or jumper settings for either drive is wrong, your PC may not start.

Fortunately, most drive manufacturers make jumpers easy to figure out. The settings for most of the models we tested are printed right on the drive as well as in the manual (Quantum's settings are only in the manual). The Seagate and Western Digital drives are the most clearly marked; IBM's and Maxtor's take a bit of study. Nearly all the drives came set as masters.

The only drives we installed that deviated from the new-drive–master, old-drive–slave configuration were Seagate's Medalist Pro 6451 and 8641. Because Seagate's easy-to-use DiscWizard software formats and partitions the drives in Windows 95, it needs to run off your old hard drive. This process ▶

Things to Do Before and During Your Hard Disk Upgrade

SO YOU SAY you're ready to star in your own personal episode of *Home Computer Improvement*? Although you don't have to be a hardware guru anymore to install a hard drive, Murphy's Law remains in effect, and things can go wrong. For a stress-free upgrade, keep this list handy.

BEFORE

➢ **Allow plenty of time—several hours, to be safe.** And while burning incense and meditating isn't necessary, it helps to be in a serene state of mind.

➢ **Install during tech support hours.** Make sure you can call for help immediately if necessary. IBM has 24-hour phone support every day, but many other companies don't answer calls in the evening or on the weekend.

➢ **Create a DOS boot disk.** All hard drive installation software (except Seagate's) requires that you boot from a DOS floppy. If you don't make this disk before you remove the old drive, you may have to start all over again. Place a blank floppy in your PC, open *My Computer*, right-click on the *A: drive* icon, and choose *Format*. Check the *Copy system files* box, and format the disk. Reboot from the floppy (restart your computer with the disk in the A: drive) to make sure the disk works.

➢ **Get your FAQs straight.** Most hard drive makers have an area on their Web site for frequently asked questions. Read it, and if it isn't too long, print it out. It may contain crucial information not in the installation manual. Also, visit the Web site of the manufacturer of your old drive, so you can print out its jumper settings.

➢ **Get to know BIOS.** Make sure you know how to get into your PC's BIOS setup program and find the settings for your hard drive. Familiarize yourself with how the program works before you take anything apart.

➢ **Consider a BIOS update for your PC.** Newer versions of BIOS setup software handle jumbo hard drives better, but they aren't always necessary. Check your PC maker's Web site for BIOS update software you can download. If your PC requires a replacement of the actual chip to upgrade BIOS, don't bother. The installation software that comes with your upgrade kit should be able to handle any major incompatibilities.

➢ **Check the brackets.** All the kits we tested come with standard mounting brackets that work with most PCs. But some systems (from Compaq, HP, and IBM, among others) use proprietary brackets. An extra set or two may have come in the box with your PC. If not, contact your dealer or your PC maker's tech support to get them before you begin.

➢ **Gather your tools.** You'll need a medium-size Phillips screwdriver for mounting your new drive, and a pair of needle-nose pliers or tweezers to set tiny drive jumpers.

➢ **Back up, back up, back up.** Back up your PC completely before you begin.

DURING

➢ **Double-check cable connections.** Make sure the EIDE cable to your new drive is connected properly. Some connectors have a plastic notch that prevents plugging them in backward; if not, note that the red wire on the cable always goes to pin 1 (marked on the drive's connector). The rectangular plastic DC power plug is just as important. Reversing the connection can destroy the drive. Look for the beveled edges on the connector and on the drive, and never force a plug if it doesn't go in easily.

➢ **Don't panic if your PC locks up or gives you an error message after you've installed the new drive and turned on your PC.** Your PC's BIOS probably didn't recognize the drive and stopped the boot process. You may need to enter settings manually in your system's setup program, or in some cases, trick your PC with bogus settings. All of the upgrade kits we tested provide instructions for handling precisely this situation. —S. M.

PHOTO: JOHN KUCZALA

Compaq Deskpro® EP Series Model 6400X/6400/CDS **$2,269**[1]

- Intel® Pentium® II Processor @ 400 MHz
- 64MB SDRAM
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- 24X Max CD-ROM[2]
- Compaq V75 17" (16" viewable) monitor
- Towerable chassis converts from desktop to minitower
- 3-year limited warranty[3]

Compaq Deskpro EP Series Model 6266X/2100 **$1,299**[1]

- Intel Celeron™ Processor @ 266 MHz
- 16MB SDRAM
- 2.1GB SMART II Ultra ATA Hard Drive
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- ATI RAGE IIC AGP Graphics
- 24X Max CD-ROM[2]
- Compaq V75 17" (16" viewable) monitor
- Towerable chassis converts from desktop to minitower
- 3-year limited warranty[3]

Deskpro EN 6266X/3200 $1,669[1]

The Deskpro EN Series features a breakthrough design that raises the bar on manageability and serviceability.

- Intel Pentium II Processor @ 266 MHz
- 16MB SDRAM
- 3.2GB SMART II Ultra ATA Hard Drive
- ATI RAGE PRO TURBO AGP Graphics
- Compaq Premier Sound
- Compaq V75 17" (16" viewable) monitor
- 3-year limited warranty[3]

Deskpro EN 6350X/6400 $2,219[1]

- Intel Pentium II Processor @ 350 MHz
- 32MB SDRAM
- 6.4GB SMART II Ultra ATA Hard Drive
- ATI RAGE PRO TURBO 2X AGP Graphics
- Compaq 10/100 TX PCI Intel NIC with Remote Wakeup
- Compaq Premier Sound
- Compaq V75 17" (16" viewable) monitor
- 3-year limited warranty[3]

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- Additional 32MB SDRAM Memory: **$139**[1]
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- SuperDisk LS-120 Drive: **$129**[1]
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- 20X Max CD-ROM[2]
- 33.6Kbps Telephony modem (K56flex upgradable)[4]
- Li Ion battery
- Integrated AC adapter
- Multibay design supports second hard drive, second battery, SuperDisk LS-120 drive, or DVD option
- Full docking support capabilities with the ArmadaStation Expansion Base

Armada 7792 $4,479[1]

The high-performance notebook with an innovative expandable design delivering desktop functionality.

- Intel Pentium Processor with MMX™ Technology @ 266 MHz
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- 32MB EDO RAM
- 13.3" CTFT display (1024 x 768)
- 20X Max CD-ROM[2]
- 33.6Kbps Telephony modem (K56flex upgradable)[4]
- Li Ion battery
- Integrated AC adapter
- Multibay design supports second hard drive, second battery, or SuperDisk LS-120 Drive
- Full docking support capabilities with the ArmadaStation Expansion Base

Armada 7362 $3,219[1]

The high-performance notebook with the perfect combination of small size, light weight, and full desktop functionality.

- Intel Pentium Processor with MMX Technology @ 233 MHz
- 3.0GB SMART Hard Drive
- 32MB EDO RAM
- 12.1" CTFT SVGA display
- 20X Max CD-ROM[2]
- 33.6Kbps Telephony modem (K56flex upgradable)[4]
- Li Ion battery
- Multibay design supports second hard drive or SuperDisk LS-120 drive
- As light as 5.6 lbs and only 1.5" thin
- Full docking support capabilities with the ArmadaStation Expansion Base

Options for Armada 7000 family of notebook computers

- ArmadaStation Expansion Base: **$779**[1]
- ArmadaStation Tower Stand: **$99**[1]
- Compaq Briefcase: **$99**[1]

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- ATI RAGE IIC AGP Graphics
- 24X Max CD-ROM[2]
- K56flex Data/Fax modem[4]
- Microsoft Word 97
- Compaq Microsoft® IntelliMouse™
- Compaq V75 17" (16" viewable) monitor
- 3-year limited warranty[3]

Model 6300/4300/CDSM $1,869[1]

- Intel Pentium II Processor @ 300 MHz
- 32MB SDRAM
- 4.3GB SMART II Ultra ATA Hard Drive
- ATI RAGE IIC AGP Graphics
- 24X Max CD-ROM[2]
- K56flex Data/Fax modem[4]
- Microsoft Office 97 Small Business Edition
- Compaq Microsoft IntelliMouse
- Compaq V75 17" (16" viewable) monitor
- 3-year limited warranty[3]

Model 6400/6400/CDSM $2,369[1]

- Intel Pentium II Processor @ 400 MHz
- 64MB SDRAM
- 6.4GB SMART II Ultra ATA Hard Drive
- ATI RAGE PRO TURBO AGP Graphics
- 24X Max CD-ROM[2]
- Microsoft Office 97 Small Business Edition
- K56flex Data/Fax modem[4]
- Compaq Microsoft IntelliMouse
- Compaq V75 17" (16" viewable) monitor
- 3-year limited warranty[3]

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Specifically designed for the small and medium-sized business customer, the Armada SB is the fully integrated notebook that features Microsoft Office 97 Small Business Edition.

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- Intel Pentium Processor with MMX Technology @ 200 MHz
- 3.2GB SMART Hard Drive
- 32MB RAM
- 12.1" CSTN SVGA display
- 20X MAX CD-ROM[2]
- K56flex modem[4]
- NiMH battery
- Integrated AC adapter
- Dual bay design supports second battery (one NiMH ships standard)
- Microsoft Office 97 Small Business Edition and Norton AntiVirus 4.0 preloaded

COMPAQ PROSIGNIA 200 SMALL BUSINESS SERVER SOLUTION

An integrated turnkey solution for small businesses needing inexpensive file/print, communications, or database capabilities and bulletproof server reliability without the overhead cost of in-house technical expertise.

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- 4/8GB SLR enterprise-class tape drive
- K56flex modem[4]
- Pre-installed Microsoft Back Office Small Business Server including 10 user clients (upgradable to 25 user clients) and Insight Agent Events Notification Tool
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- Extend your business to the Internet, either locally or through an Internet service provider
- Back up and protect your business data quickly, easily, and efficiently
- Efficiently share data and devices such as printers and modems
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- 2.1GB Hard Drive
- 32MB RAM (expandable to 96MB)
- 12.1" CSTN SVGA display
- NiMH battery
- Dual bay design supports second battery

Compaq Armada 1573 $2,299[1]

- Intel Pentium Processor with MMX Technology @ 233 MHz
- Integrated 20X Max CD-ROM[2], K56flex modem[4], and AC adapter
- 3.2GB SMART Hard Drive
- 32MB RAM (expandable to 96MB)
- 12.1" CSTN SVGA display
- Li Ion battery
- Dual bay design supports second battery

Compaq Armada 1592 $2,869[1]

- Intel Pentium Processor with MMX Technology @ 233 MHz
- Integrated 20X Max CD-ROM[2], K56flex modem[4], and AC adapter
- 3.2GB SMART Hard Drive
- 32MB RAM (expandable to 96MB)
- 12.1" CTFT SVGA display
- Li Ion battery
- Dual bay design supports second battery

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Circle 51 on reader service card

adds a step to the installation. To set up a Seagate drive, you must temporarily jumper it as a slave, hook it up to the other connector on the same cable as the old hard drive, and change it later to be the master. Fortunately, the procedure is explained thoroughly in Seagate's manual.

PLUGGING IN

Next, you'll have to hook up your new drive to your PC's power. You can usually find an inch-wide, rectangular plastic connector hanging off the bundle of cables emerging from your PC's power supply. If you can't find a free power connector anywhere, you'll need a Y-adapter. This device, available for a few bucks at most computer stores, splits a single power connector into two.

Mounting your new drive in your PC is the easiest part of the installation, but you must still be extremely careful. Even a bump can damage the drive's delicate internal components. Most PC cases have free drive bays. With the exception of Quantum's aptly named Bigfoot drives (which require a 5.25-inch drive bay), all the drives we installed are 3.5 inches high. If you can't find a place to mount the drive (such as the bay where the old one sat), check your PC's manual.

Nearly all the kits we tested come with mounting brackets to make 3.5-inch drives fit in 5.25-inch drive bays. (The 5.25 inch Bigfoot drives don't need brackets.) One caveat: Some name-brand PCs require proprietary brackets that are available only from the manufacturers. In particular, Compaq, Hewlett-Packard, and IBM are notorious for this arrangement. Check your system to make sure you ▶

TEST REPORT

Drive Kits Show Their Age

The newest drives, not yet in kits, spin faster and use cutting-edge drive heads, boosting their scores.

	DRIVE[1]	Size (GB)	Spin rate (rpm)
6.5GB or smaller kits	Seagate Medalist Pro 6451*	6.4	5400
	Maxtor 6.4GB DiamondMax 2160	6.4	5200
	IBM Deskstar 5	6.5	5400
	Quantum Bigfoot TX 6	6.0	4000
	Western Digital Caviar AC 36400	6.5	5400
	Western Digital Caviar AC 35100	5.2	5400
	Fujitsu MPB3064AT	6.4	5400
	Fujitsu MPB3052AT	5.2	5400
8GB or larger kits	Maxtor 8.4GB DiamondMax 2160*	8.4	5200
	Seagate Medalist Pro 8641	8.6	5400
	IBM Deskstar 8	8.5	5400
	Quantum Bigfoot TX 8	8.1	4000
	Quantum Bigfoot TX 12	12.0	4000
Only in new PCs	IBM Deskstar 14GXP	14.4	7200
	IBM Deskstar 16GP	16.8	5400
	Seagate Medalist Pro 9140	9.1	5400
	Quantum Fireball SE 8.4	8.4	7200

*Best buy

File copy File search Video capture

TEST PC WORLD CENTER **HOW WE TEST** Each hard drive was installed as the master drive in our testbed system, a Micron Pentium MMX-233 with 32MB of RAM, 512KB of secondary cache, and an ATI All-In-Wonder Pro video card. We formatted the drives using FAT32, made two equal-size partitions, and installed the latest version of Windows 95 and ATI's video capture utility, ATI Player. For the file copy test, we timed Windows Explorer as it copied 160MB of data from one partition to another. The file search test used Windows 95's built-in Find function to search the contents of hundreds of files for specific text. For both these tests, we recorded the total number of seconds required to complete the task; a smaller time meant the drive performed better. In the video capture test, we used ATI Player to save an uncompressed video stream at 640 by 480 resolution directly to the hard drive. We recorded the actual frame rate (where an ideal drive saves video at 30 frames per second); a larger number in this test indicates faster performance. [1]All drives listed in order of overall value.

don't need these special brackets before you begin. In addition, you'll have to buy your own brackets for the Fujitsu (or any other bare-bones) drives if your system doesn't have any 3.5-inch drive bays open. But regardless of whether you use brackets, you should always use the screws that come with the drives. Screws that are too long can damage a drive.

THE SECRET LIFE OF BIOS

Once your new hard drive is in place, it's time to adjust your PC's setup program. This program resides in the BIOS chip on your motherboard and sets up all the peripherals when you start a PC. Every PC's BIOS setup program is slightly different. Fortunately, new "smart" BIOSes and installation utilities make some of the complexity associated with BIOS setup a thing of the past.

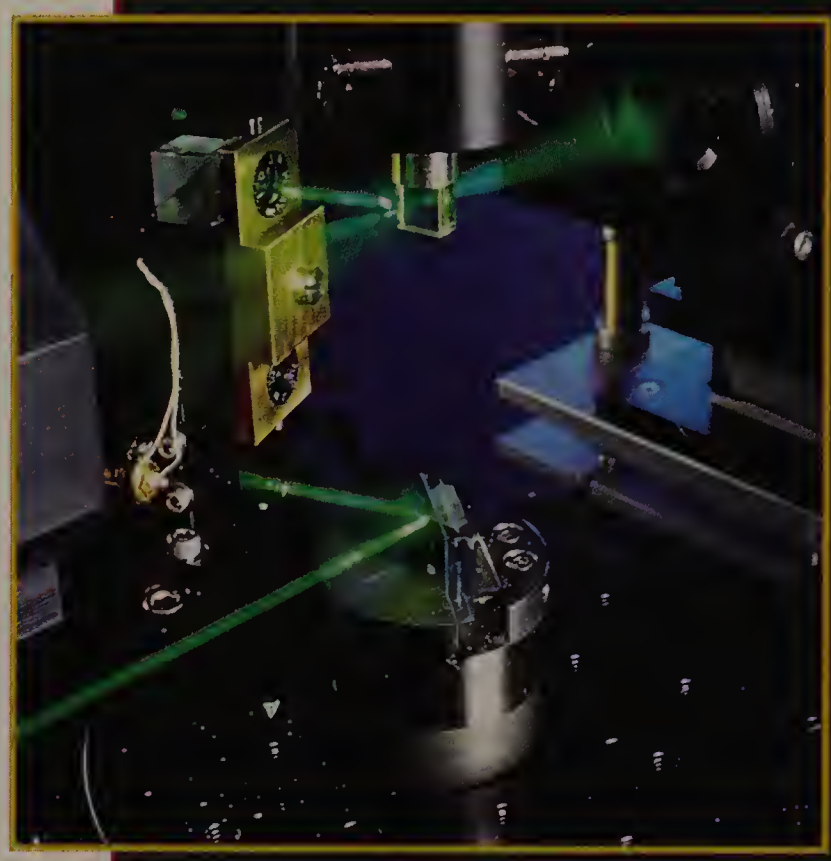
In pre-Pentium days, people had to manually enter such esoterica as the number of cylinders, heads, and sectors per track (also known as CHS settings) into the setup program. Today, if you can set the program's hard drive detection to Auto, the BIOS will automatically send a "Who are you?" message to everything connected to the EIDE cables. Each device responds with coded information, and all the necessary data is retrieved—without your involvement.

If the hard drive is larger than 8.4GB, though, it may present complications. Occasionally, you may be unable to manually enter into the setup program CHS settings that are big enough to handle the largest drives. Older setup programs in particular have this built-in limitation. If your PC is of an older vintage—especially if it's a 486-based system made before 1994—you're more likely to run into these problems, though it can happen on a newer computer, too.

In these rare cases, you'll have to rely on the setup software that comes with the drive. (With Fujitsu, IBM, and Quantum drives, you must download Ontrack Disk Manager from the vendor's Web site.) This program installs an overlay that does an end run around the limitations of the BIOS setup program to enable your ▶

Star Wars Storage

THE REBEL SPY who stole the Death Star's plans in *Star Wars* didn't sneak those plans out on 8-inch floppies that were common in the mid-1970s. He used a storage device the size of a credit card. For dramatic purposes, director George Lucas needed to invent a storage medium that was small enough to be hidden easily and audiences would believe could hold a detailed blueprint for a planet-size space station. The result: Princess Leia jammed a fictional equivalent of the world's first flash memory PC Card, containing the secret plans, into R2D2's card slot.



3D STORAGE: IBM's prototype Holographic Data Storage device uses green lasers to etch data into layers of a special crystal.

Flash memory, used to store digital camera photos, isn't the only storage technology that once seemed possible only in science fiction. In the not-too-distant future, we may head down to our local store to buy a solid-state or crystal-based hard drive—or, if one manufacturer has its way, a super-capacious hard drive of extraterrestrial origin.

FREE SPACE: THE FINAL FRONTIER

Remember the unlimited repository of information Captain Picard had at his fingertips? DiskOnChip drives, made of high-capacity memory chips like those in a PC's RAM, show promise as the storage medium of choice for future video-on-demand services, although this technology is prohibitively costly for the average user ($1395 buys you a 128MB EIDE FlashDisk, which is the largest size available). M Systems, the developer of DiskOnChip technology, is the only company we know of that sells such drives. • **DiskOnChip; $11 to $22 per MB; M Systems; 510/413-5950; www.m-sys.com**

READER SERVICE NO. 636

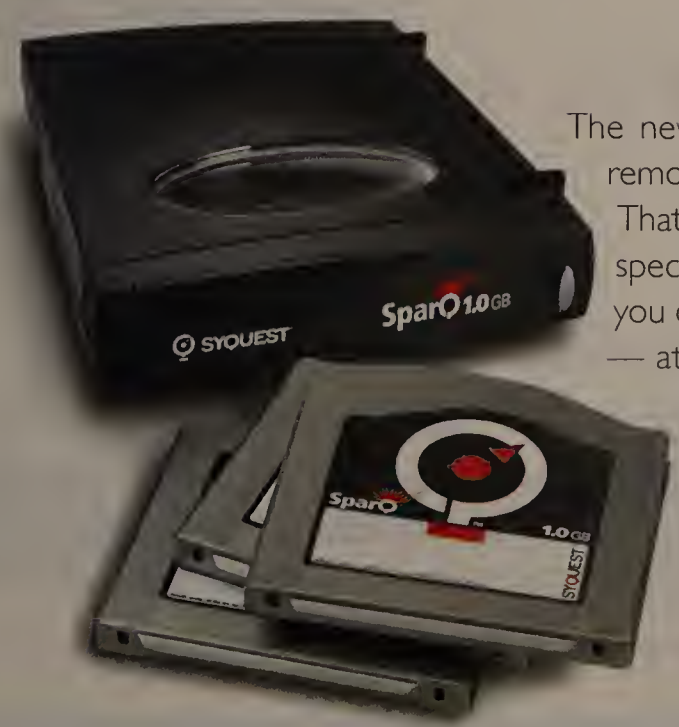
THE LAST, BEST HOPE FOR STORAGE

Characters on the *Babylon 5* TV series store, transport, and exchange immense amounts of data on small, translucent "data crystals." Coincidentally, scientists at IBM's Almaden Research Center in San Jose, California, have created a prototype device that uses a crystal to store data. Scientists in the lab discovered a way to manipulate the crystal's structure with lasers and store data three-dimensionally in holograms within the crystal's volume. The greatest benefit of holographic storage is that huge amounts of data locked in the crystal matrix can be accessed instantaneously. The iron-doped lithium niobate crystals are grayish in color and the size of Las Vegas dice. Although still in the experimental stage, they may one day replace hard drive platters as a storage medium.

THE TRUTH IS OUT THERE

Isn't this the plot of an old *X-Files* episode? Cranford, New Jersey-based American Computer Company is building what it claims is an alien-derived storage device. The small PC manufacturer says the prototype solid-state drive was designed using stolen government plans from an alien ship that allegedly crashed in Roswell, New Mexico, in 1947. The poker-chip-size Transcapacitor drive is said to store about 90GB of data (of Earth origin). We'll reserve judgment until we have a TCAP drive in the PC World Test Center, but until then you can read all about the drive on ACC's Web site (american-computer.com/roswell.html). —Andrew Brandt

Think Gig.



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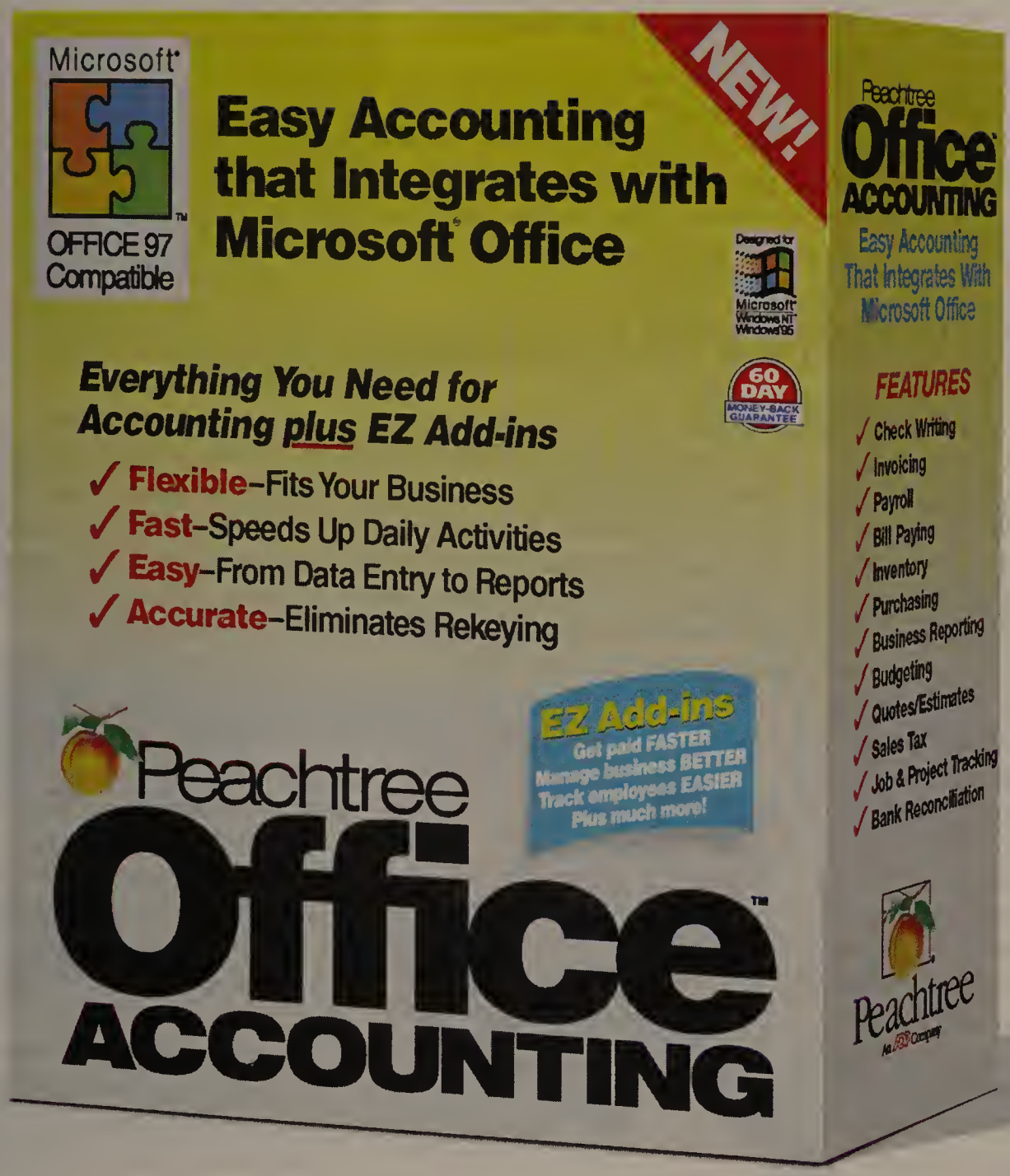

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Circle 175 on reader service card

PC to use the full capacity of the drive. But in a weird catch-22, you need to start up the drive before you can install the overlay. The software works around this problem by temporarily "fooling" your PC into thinking the drive is installed (usually by entering bogus values into the setup) so that the overlay can be installed.

The only upgrade kit drive with which we needed to install the overlay was Quantum's 12GB Bigfoot TX, the biggest kit drive we tested. The drive instructions told us the temporary values to enter. Once we did that, the drive worked fine.

If all this business sounds confusing and complicated, don't panic. The documentation that comes with the hard drive kits (again, except the Fujitsus) explains these steps clearly.

FORMATTING: THE FINAL FRONTIER

Congratulations. You've made it to formatting and partitioning your new hard drive and copying your files over. Now you're ready to start your PC with that DOS boot floppy you made beforehand. The Seagate drives are the exceptions: You run DiscWizard from Windows 95.

In the past, to partition and format you needed to use FDISK, a DOS program with one of the worst user interfaces in history. (In addition to being difficult ▶

Beating the Digital Pack-Rat Syndrome

A FULL HARD DRIVE is like an overflowing closet: crammed with junk and too much of a hassle to clean out. The solution: Check out these tips to keep your disk neat and organized from the start. And as long as you're cleaning up, dump any unused files. You may find that you don't even need a new hard drive. After all, you don't run out and buy a new house every time your closet overflows.

➢ **Make a place for everything.** Do you save files the way you put things away in your closet, just opening the door and chucking them in? If you answered yes, it's time to change your sloppy ways. With long file names and third-party Windows Explorer programs at your disposal, there's no excuse for not storing data in appropriately named, neatly arranged directories. If you miss the way Windows' File Manager used to help you keep things organized, we recommend PowerDesk Utilities 98 from Mijenix as a replacement.

• **PowerDesk Utilities;** $40 list; Mijenix; 303/245-8000 www.mijenix.com

READER SERVICE NO. 633

➢ **Format with FAT32.** You can save a lot of space by formatting your hard drive with the new FAT32. In the latest version of Windows 95, Windows NT, and Windows 98, you can take advantage of this file system, which saves space consumed by many small documents. Files on a hard drive are stored in one or more fixed-size clusters, and bytes that are unused in the file's last cluster are wasted. FAT32's clusters are smaller (and hence more efficient) than FAT16's. A 2KB file stored on a 1.5GB FAT16 partition, for example, uses 32KB of disk space because each cluster takes up 32KB; with FAT32, the same file uses 4KB of space because FAT32's clusters are much smaller. For more information about FAT32, see "Future Developments" on PC World Online (www.pcworld.com/hardware/storage_backup/articles/apr97/1504p1691.html) or Microsoft's FAT32 FAQ at premium.microsoft.com/msdn/library/periodic/html/w9p9794.htm.

➢ **Throw out temporary files.** Temporary and cache files are the detritus of Web surfing and installation that fills space on your hard drive. With every application you install and with each new Web page your browser loads, you lose a little more space. Fortunately, it's easy to reclaim. You can delete the temporary cache files in the Preferences window of your Web browser and also set your browser to keep a smaller cache. Likewise, you can safely delete the contents of the C:\Windows\Temp\directory, which is where the system throws unnecessary files after software is installed. Software like CyberMedia's Uninstaller 4.51 will find and delete all these files for you, as well as remove unnecessary registry entries and other rubbish left behind by other programs. • **Uninstaller 4.51;** $40 list; CyberMedia; 310/581-4700; www.cybermedia.com

READER SERVICE NO. 634

➢ **Defragment your hard drive.** The huge amount of storage available on today's drives mean that files can more easily become fragmented. When that happens, the hard drive must search for pieces of files, a process that eventually degrades performance. The Speed Disk utility from Symantec's Norton Utilities is the fastest defrag program. You can also get the job done for free (albeit slowly) with Windows 95/98's Disk Defragmenter program (click *Start•Programs•Accessories•System Tools•Disk Defragmenter*).

➢ **Archive old data.** You don't need a slow, clunky tape drive to archive volumes of data anymore. Compress old files you don't need now (but just can't live without) with a free, no-frills archival program like PKWare's PKZip. For a more full-featured commercial utility, try Mijenix's $40 ZipMagic software. • **PKZip;** freeware; PKWare; 414/354-8699; www.pkware.com • **ZipMagic;** $40 list; Mijenix; 303/245-8000; www.mijenix.com

READER SERVICE NO. 637

➢ **Add storage with removable media.** If you must keep large documents or programs, consider using removable storage, which lets you add a little storage space at a time and move easily from one PC to another. Iomega's Zip and Jaz drives and SyQuest's SyJet drives are the most popular devices. Files you want to share, downloaded software, and seldom-used documents stand as natural candidates for removable storage. You can also install many applications on a removable disk, which saves you from having to install rarely used applications on your hard drive. • **Zip,** $149 list; **Jaz,** $299 to $469 list; Iomega; 800/697-8833; www.iomega.com

READER SERVICE NO. 638

• **SyJet;** $299; SyQuest; 510/226-4000; www.syquest.com

READER SERVICE NO. 639 —A. B.

PHOTO: JOHN KUCZALA

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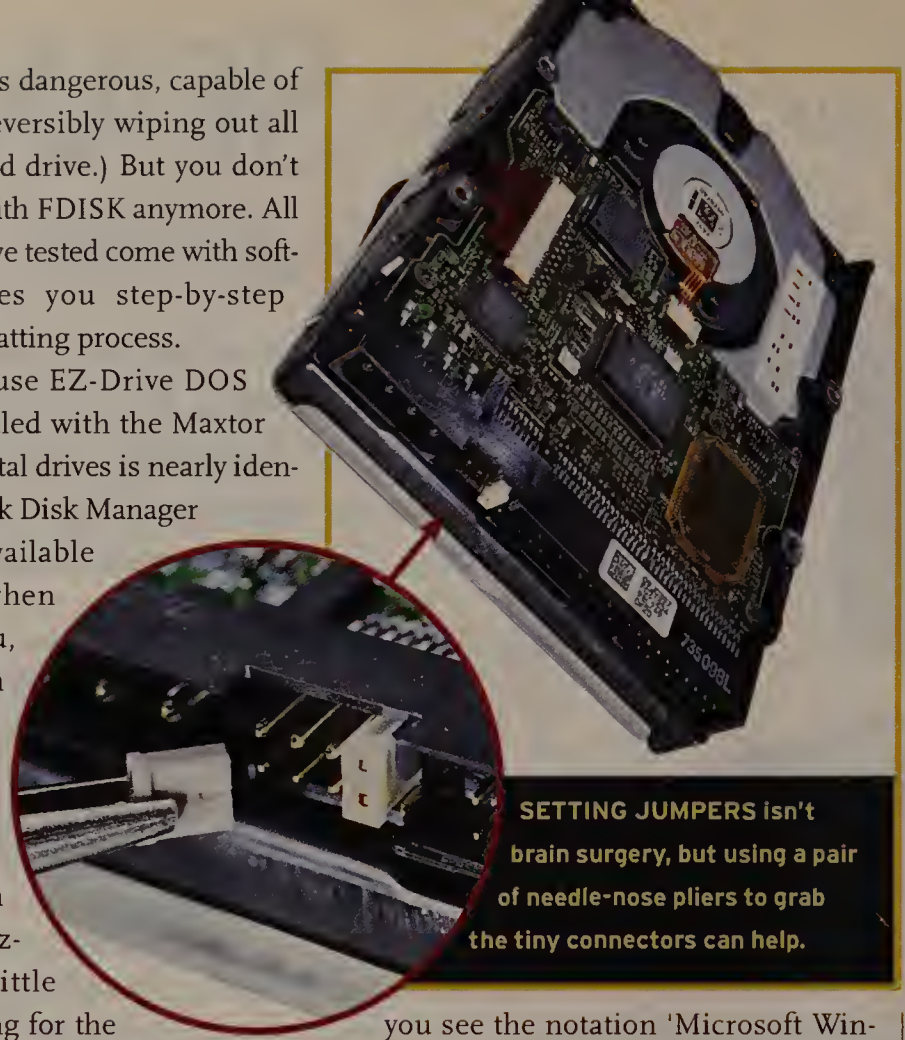
to use, FDISK was dangerous, capable of instantly and irreversibly wiping out all the data on a hard drive.) But you don't need to wrestle with FDISK anymore. All the upgrade kits we tested come with software that guides you step-by-step through the formatting process.

The Micro House EZ-Drive DOS application bundled with the Maxtor and Western Digital drives is nearly identical to the Ontrack Disk Manager DOS software available for download when you buy a Fujitsu, IBM, or Quantum drive kit. The easiest of the software packages to use, however, is DiscWizard from Seagate. DiscWizard provides a little extra hand-holding for the technophobe, and even estimates the time each step will take.



SETTING JUMPERS isn't brain surgery, but using a pair of needle-nose pliers to grab the tiny connectors can help.

The included software formats your hard drive in one of two ways. In the latest version of Windows 95 (also known as OSR2) and Windows 98, you can format the drive into a single FAT32 partition, which means the drive's entire capacity will be on the C: partition. If you have an earlier version of Windows 95 or are using Windows 3.*x*, you must format the drive using FAT16; your system won't be able to read a drive formatted with FAT32 and will force you to reformat it. (You can check which version of Windows 95 you have by right-clicking on *My Computer*, and choosing *Properties* from the menu. If you see the notation 'Microsoft Windows 95 4.00.950 B', you have the latest version.) FAT16 partitions can be no larger than 2GB, so for an 8GB drive, a minimum of four drive letters would be assigned. On the other hand, a FAT16-formatted drive finds information more quickly than a FAT32 drive, though the nuisance of keeping multiple drive letters straight is hardly worth the wee 3 to 4 percent boost in drive performance.

Each formatting program offers both a quick setup option (which automatically sets multiple partitions of equal size) and customizing options for creating partitions of varying sizes. Then the program formats the drive with those partitions.

Now, you're ready to reinstall your old drive, assuming you want to keep it (and there's no reason not to). Although you can do this after installing the new drive, if you reinstall it before you've formatted the new disk, you risk accidentally formatting your original drive and erasing all your data. Ouch! (Fortunately, you have that backup we told you to make, right?)

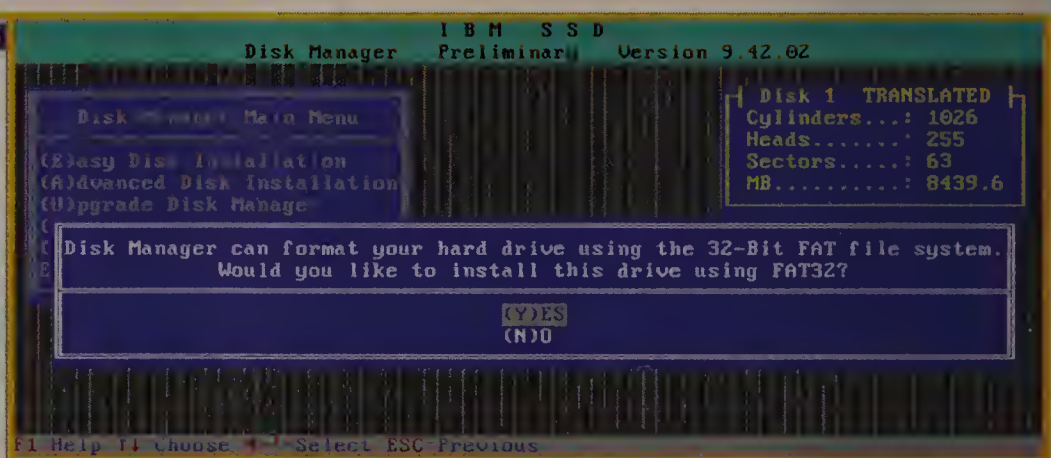
All the software packages can copy all the data from your original drive onto your new drive. Afterward, simply restart your PC, and you'll be up and running. (With the Seagate drives, because you must first set the new drive as the slave, your last step will be to swap the new and old drives and jumpers to make Seagate's drive the master.)

CROSSING THE FINISH LINE

Don't be scared of Godzilla-size drives because they're huge. Drive makers have always struggled to keep up with users' storage demands, which are believed to double each year. But thanks to recent technological innovations such as Giant MagnetoResistive drives and faster revolutions per minute, drive makers are finally getting ahead of users' needs. This year's hard drives are more than four times the size of last year's models, at close to the same price.

If you're overdue for an upgrade, these drives are a colossal bargain. They're easier than ever to install and they should gratify the needs of even the most unrepentant digital pack rat for years to come.

Stan Miastkowski is a PC World *contributing editor. Andrew Brandt is an associate editor for* PC World. ■



DISCWIZARD (left) comes with all Seagate drives. It runs on Windows 95 and has an intuitive interface that makes any of the Seagate drive kits an ideal choice for novices. ONTRACK DISK MANAGER (above), the program favored by power users, is indicative of the DOS-based utilities bundled with most drive upgrade kits.

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- 8.4GB Ultra ATA Hard Drive
- 3Com 10/100 Ethernet Adapter
- DMI 2.0 Compliant and Intel LANDesk Client Manager 3.1

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E-4200 400

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- 128MB SDRAM
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- 8.4GB Ultra ATA Hard Drive
- 3Com 10/100 Ethernet Adapter
- DMI 2.0 Compliant and Intel LANDesk Client Manager 3.1

$2999 GoldValue Lease✗ $106/mo.

NS-Series Servers

NS-7000 233

- Intel **Pentium II** Processor 233MHz with 512K ECC Cache
- 64MB EDO Memory (expandable to 512MB)
- 4GB Ultra Wide SCSI Hard Drive
- 3Com 10/100 Ethernet Adapter
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- 128MB EDO Memory (expandable to 512MB)
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- 3Com 10/100 Ethernet Adapter
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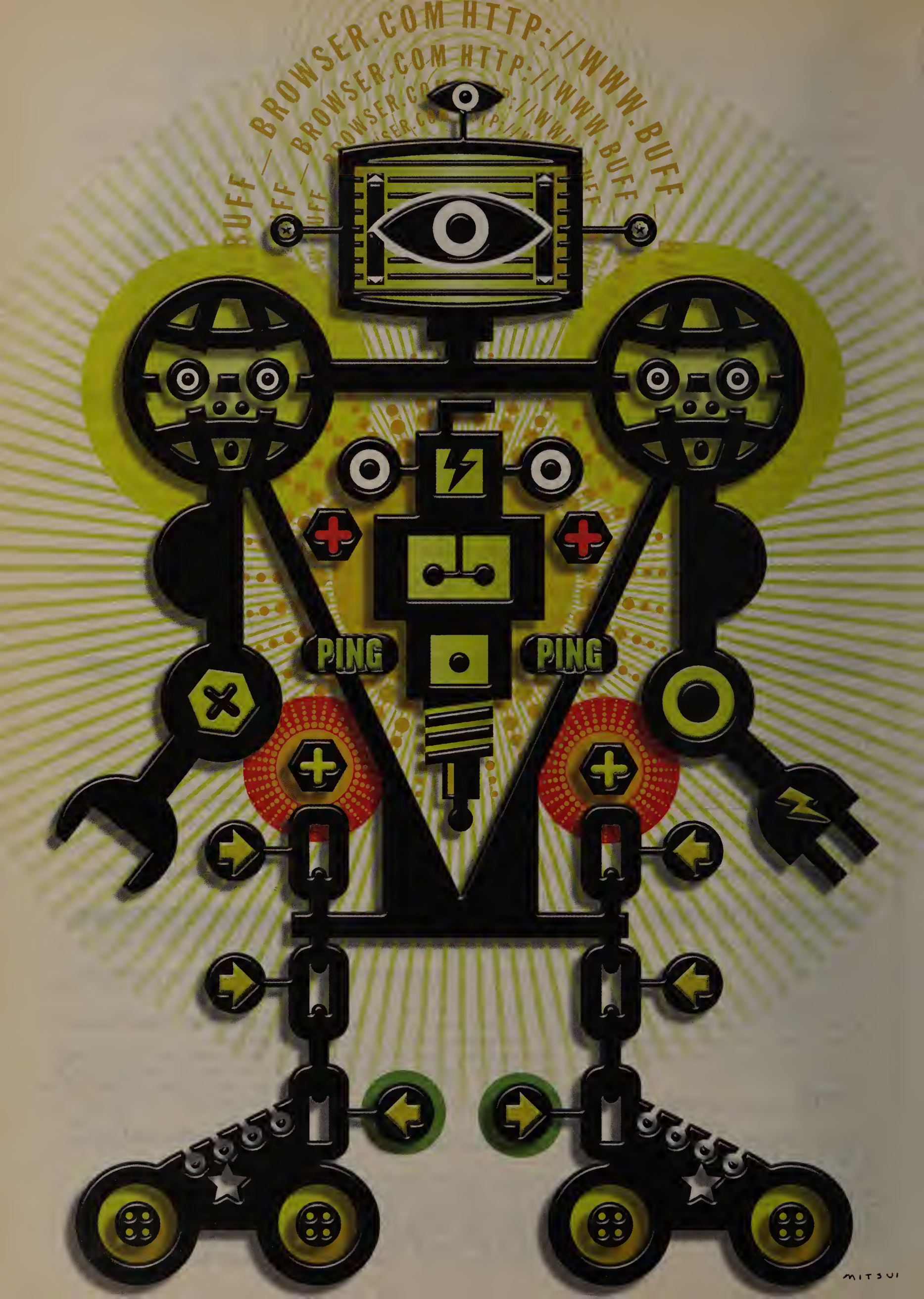
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ILLUSTRATIONS BY GLENN MITSUI

pump up your browser

Internet Explorer and Netscape are wimpy. Whip them into shape with these Web utilities—bookmark managers, download tools, offline browsers, connection aids, even audio and video plug-ins.

BY ARNIE KELLER, MATT LAKE, AND DAN LITTMAN

DOES YOUR BROWSER PERFORM like a 98-pound weakling? Does it lack tone and definition as it schleps from one boring link to the next or drags around looking for search results? Then maybe it's time to expose that lightweight to some physical culture and sculpt its Web surfing muscles.

Browser add-ons are the protein shakes of the Web. These low-cost or free utilities promise to beef up your surfing experience by adding features your current browser implements poorly or not at all. But just as some fitness aids aren't worth their weight, some surfing utilities won't do much to turn your browser into the hero of the beach. And hundreds of programs are out there. Which ones are worth trying? So you can gain without pain, we ▶

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scoured store shelves as well as all the major shareware sites, including Tucows (www.tucows.com) and PC World Online's FileWorld (www.fileworld.com). Altogether, we reviewed 38 promising utilities. Though our Best Buys may not give Navigator or Internet Explorer buns of steel, we promise you'll notice an improved physique, making the Net faster, easier, and more interesting to use.

WASHBOARD APPS

IF YOU FIND paging through a Web site more tedious than doing morning sit-ups, check out our review of Web accelerators and offline browsers in "Browsing Faster." Both types of utilities claim to make links connect faster. Web accelerators speed up your browser's built-in page caching, install their own cache on your PC, or do both. Offline browsers download a site's links plus—unlike Navigator and Internet Explorer—its entire structure onto your hard disk. They work on the assumption that you can browse a site more quickly and conveniently if you don't have heavy Web traffic or a slow modem connection to contend with.

All five of the accelerators we tested shaved a few seconds off some link-to-link jumps, but beware: Because of the way they work, some programs can crash your system. Our Best Buy, IMSI's $30 NetAccelerator 1.1, was the only accelerator that didn't bring our test system down.

Offline browsers, we found, vastly improve page-to-page progress. These utilities take up space on your hard drive with downloads, but they won't corrupt your browser settings or hog your CPU the way accelerators can. Our favorite, Anawave's $30 WebSnake 1.23, can fetch particular pages, the entire structure of a site, or individual files that contain keywords you specify.

NO-SWEAT ADD-ONS

IN "BROWSING BETTER," we look at utilities to help you hone your technique: metasearchers, bookmark managers, download managers, and connection aids. Metasearchers offer the convenience of performing ganged searches using multiple search engines like AltaVista and Yahoo. As promised, they're faster than hitting search sites one by one, and they gave us more thorough results. Our winner, Inforian's $25 Inforian Quest 98—a thorough, easy-to-use, and relatively inexpensive tool—is far better than the so-called search tools you'll find in either major browser. (Neither Internet Explorer 4.0 nor Netscape has a metasearcher; both of them query multiple search sites one by one, rather than all at once.)

Navigator and Internet Explorer can download files, but that's all. It's up to you to find the files you want—unless you use a download manager. These utilities ask you to enter the name of the file you're looking for and the search engines you prefer; the program then finds the file, removes duplicate entries from its master list, and sends the results to your browser to do the downloading. Our Best Buy download utility, Aaron Ostler's $15 GoZilla, even steers you to the site that will download the file fastest and then performs the download itself.

Do you need a more capable bookmark manager than the ones that come in Internet Explorer and Navigator? If you're a typical surfer who keeps only a handful of URLs for quick access, probably not. But if you tend to rack up dozens of sites and want more organization options than the two big browsers offer, consider QuikLink Software's $20 QuikLink Explorer, our Best Buy bookmark manager. It provides a convenient pop-up list from which you can get to your favorites more quickly, and it costs less than other bookmark managers with similar features.

Of all the utilities we looked at, connection helpers struck us as the least worthwhile. These programs dial up for you and fool your ISP into thinking you're busily surfing away, so it won't suddenly disconnect you—not exactly crucial functions. Still, they can save time and frustration. We liked Vector Development's free Dunce the best. The version of Dunce we tested doesn't include a disconnect stopper (a.k.a. a "pinger"), but a forthcoming version called Dunce Gold will. (Its release date was unknown at press time.)

PUTTING FUN IN YOUR WORKOUT

SOMETIMES HOW FIT you are matters less than how you look in your new workout togs. The same goes for your browser. If you long to see and hear more on the Web, be sure to check out "Browsing Fun," a selection of plug-ins that add music, video, and 3D to your Web surfing. "Browsing Gear," scattered throughout the story, delivers the best of the rest: top utilities that aid your Web experience by compressing files, eliminating cookies, archiving e-mail messages, and more.

BEST BUYS

THESE TOP browser utilities coax the best performance out of Navigator and Internet Explorer. IMSI's **$30 NetAccelerator 1.1** will help you sprint through Web page links, while Anawave's **$30 WebSnake 1.23** is the best program for downloading Web sites onto your hard drive for browsing at your convenience. Tired of trekking between search engines to find what you want? Inforian's **$25 Inforian Quest 98** hits hundreds of sites at once and delivers the results to you.

With an enthusiastic roar, Aaron Ostler's $15 download manager, **GoZilla 2.52**, stomps through the Web and locates the site that will download your chosen file the fastest. Looking for an easier way to manage, organize, and access your favorite sites than your browser's current bookmark manager provides? The unobtrusive **QuikLink Explorer** fills the bill for $20. Finally, the free **Dunce 2.52** is the smartest choice among connection aids, providing a range of handy utilities. Dunce automates dial-in tasks, starts multiple programs once you're online, and even reconnects you when you get dropped.

browsing faster

YOU DON'T HAVE TO travel at breakneck connection speeds to get where you're going faster. With a Web accelerator or offline browser, you can explore sites more quickly, without paying for a costly ISDN connection.

We found that most accelerators let you click through some sites faster, but it's hard to predict which sites. For instance, we noticed hardly any speed difference on CNet, but we saved nearly five seconds per page on PC World Online.

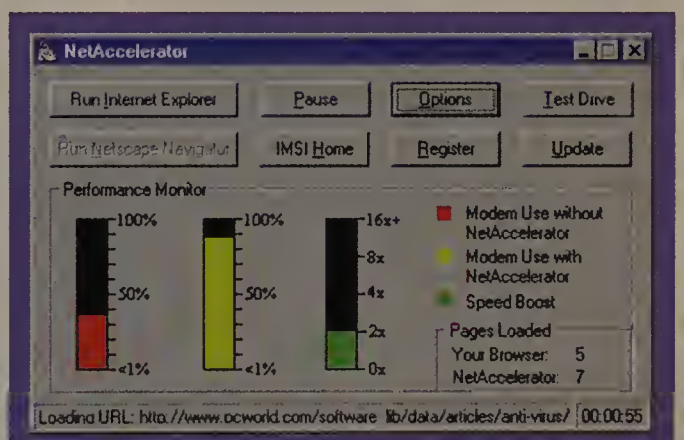
Because most Web accelerators set up your PC as a "proxy server," your browser has to check both its own cache and the accelerator's cache before loading a page. If you don't open the accelerator first—and (later) close it before you close the browser—the browser will crash. We prefer NetAccelerator 1.1, the only product we tested that doesn't use a proxy server. It works almost as well as the others, and at $30 costs less than all but one of them.

The speed improvements we saw with offline browsers were more uniform—comparable to the difference between the unreliable speed of a modem and the reliable, faster speed of a hard disk. Better yet, offline browsers let you visit a site when you don't have access to an online connection. It was tough to pick a Best Buy because we liked different features on each. The most well-rounded product, however, is Anawave's WebSnake 1.23.

WEB ACCELERATORS

NetAccelerator 1.1

NETACCELERATOR is the only accelerator here that doesn't make your PC a proxy server or change your browser's settings, so it reduces the risk of a crash. Instead, it revs up your browser's own caching feature. Start your browser from within NetAccelerator to preload pages into your browser's cache. (For top performance, double your browser's disk cache and, depending on your current RAM level, increase the memory cache, too.) NetAccelerator does preload pages with frames slower in Internet Explorer than in Navigator. But overall, it's hassle-free. You can even pause it to perform higher-priority tasks (such as e-mail) faster—a feature only PeakJet shares. By the time you read this, the speedier, more customizable NetAccelerator 2.0 will be available. If you've purchased 1.1 within the past six months, upgrading is free. • $30; www.imsisoft.com/utilities.html; free 30-day demo



NETACCELERATOR'S performance monitor uses a set of bar charts to report just how much it's speeding up your browser.

Blaze Web Performance Pack 1.5

IF YOU WANT an all-in-one Web utility, the Blaze Web Performance Pack is worth looking at. But if you want the best accelerator, metasearcher, and bookmark manager, pass on this one. The Blaze accelerator works fine with both browsers, and it speeds up links at some sites. Like PeakJet, however, it not only sets up its own cache on your PC, but replaces your browser's. As a result, if you don't close it before you close your browser, you're in for a browser crash and reconfiguration. (We had to reinstall the accelerator.) On the plus side, Blaze does several useful things, including letting you choose the number and size of pages it prefetches. Its metasearch tool is basic, but it serves up fully sorted results in a folder, and you can schedule and repeat searches. Blaze's bookmark tool adds some useful sorting capabilities to Internet Explorer's and Netscape Navigator's, and it can index and search pages. • $35; www.speeditup.com; no trial period

Got It

GOT IT IS A basic Web accelerator with a bargain price to match. Nearly indistinguishable from the other proxy-server accelerators, it moderately increases browsing speed and crashes your browser if you don't close it first. One extra: By clicking Got It's icon in the system tray on your desktop, you can pick specific pages of a cached site to look at immediately. Otherwise, Got It gives you little reason to get it. • $20 shareware; www.goahead.com/gotit

PeakJet 1.5

PEAKJET SPED UP some links more noticeably than other Web accelerators did. Links at PC World Online, for example, worked faster with PeakJet than with NetAccelerator 1.1. Unlike other competing products, however, PeakJet did ▶

BROWSING gear

Acrobat Reader

www.adobe.com

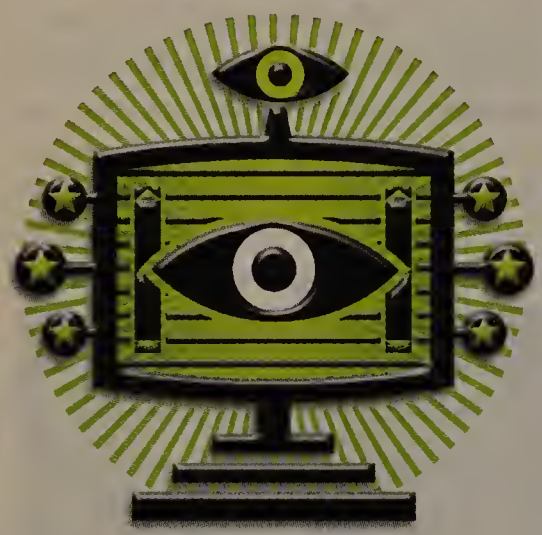
Many files on the Web (such as the IRS's tax forms at www.irs.gov) are saved in Acrobat's PDF (Portable Document Format). Any system equipped with Adobe Systems' free Acrobat Reader can display these files in its browser, regardless of the application in which they were originally created. The Reader can search text, present a table of contents, and link between words and pages inside PDF documents.

absolutely nothing to improve linking at some of the other sites we visited. PeakJet has the same handy pause feature as NetAccelerator, letting you (for example) perform a large upload faster. As with the Blaze Web Performance Pack, however, PeakJet replaces your browser's cache. In the event of a crash, you'll have to fix your browser's settings. • $30; www.peak.com; free 30-day demo

Speed Surfer 3.2

SPEED SURFER 3.2 has the same limitations as every other proxy-server accelerator, but it offers few of the extras—such as cache pausing—that might justify its price. Like Got It, Speed Surfer lists the pages it has prefetched when you click on its system tray icon. But you can't choose pages to view. • $30; www.kissco.com; no trial period

OFFLINE BROWSERS



WebSnake 1.23

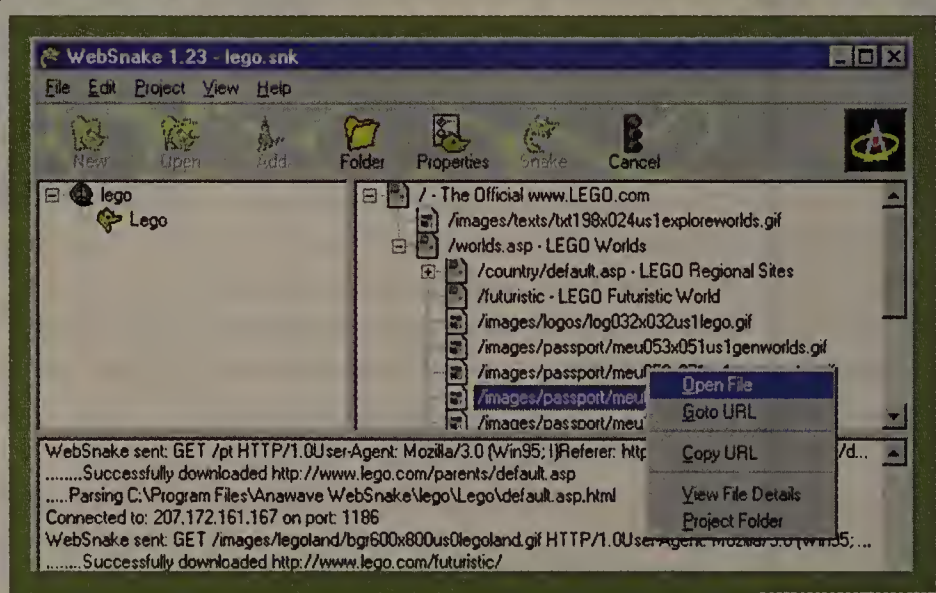
WEBSNAKE 1.23 OFFERS an apple you'll want to bite. This easy-to-use utility wriggles through sites and delivers unique and useful results, including a map of the site's structure, or files that contain keywords you specify. And WebSnake's three-paned interface is easy to use. Its wizard can schedule recurring or single sessions. The only hiss WebSnake deserves is for the help it gives spammers: It copies all the e-mail address references on a site, a handy feature for mass marketers. • $30 ($45 for disks and manual); www.anawave.com/websnake; free 30-day demo

BlackWidow

LIKE WEBVCR (see below), BlackWidow makes viewing downloaded sites easier by offering a browser interface. It has two interfaces, in fact: a built-in browser with a preview window, and another that supports your existing browser. The best thing about BlackWidow is the Explorer-style directory tree it creates when you profile a site, which makes it particularly easy to select and download only what you want, whether it be pages, parts of pages, or even graphics. BlackWidow's downfall is its pokiness. It took about 30 minutes to download www.computerpress.org—twice as long as WebSnake. • $40; www.softbytelabs.com; free 15-day limited demo

WebVCR

DON'T WORRY—despite the name and its VCR-like interface, WebVCR is easy to program. Once you've "taped" a Web site, WebVCR loads it into your browser as it would appear if you were online—complete with correct URLs. (In contrast, most other offline browsers translate sites into cryptic-sounding files on your hard disk.) WebVCR compresses HTML pages into a single proprietary file, which helps save almost as much disk space as WebWhacker does. When you load a Web "tape," WebVCR sends the site to your browser, and voilà: offline surfing at its best. If your buddies have copies of WebVCR, you can share browser-viewable sites with them. If not, you can export WebVCR files to HTML format so others can read them. • $40; www.netresultscorp.com; free 15-day demo



WEBSNAKE'S informative interface shows the site structure (right) and posts a report of its searching progress (bottom).

BROWSING gear

Cookie Cutter PC

www.ayecor.com

Cookies may sound tasty, but on the Web they're the sneaky way many sites keep track of who you are and when you visit. If you've instructed your browser not to accept cookies, many sites will either bar you from entering or pester you with multiple requests for permission to install their cookies. With AyeCor Software's Cookie Cutter PC, you can accept cookies wholesale when you arrive at a site and then delete them after you leave. The $15 program displays a list of the cookies it finds in your system, letting you choose which ones to delete.

WebWhacker 3

THE GRANDDADDY of offline browsers, WebWhacker has a couple of unusual positives. It saves disk space by crunching Web sites to a tenth of their GIF and HTML sizes. When we downloaded www.computerpress.org using WebSnake 1.23, the file took up 803KB; WebWhacker slimmed it down to 319KB. And like WebVCR, WebWhacker can export pages into HTML, so you can share downloads with others. We also like its history feature, which lets you see the titles of all the pages you have "whacked" and sort them into categories. And unlike the other offline browsers, WebWhacker can refresh downloaded pages at the press of a button. It also has a search engine for pages you've visited. But for all WebWhacker's charms, we found WebSnake more useful overall. • $50; www.bluesquirrel.com/whacker; free 30-day limited demo ▶

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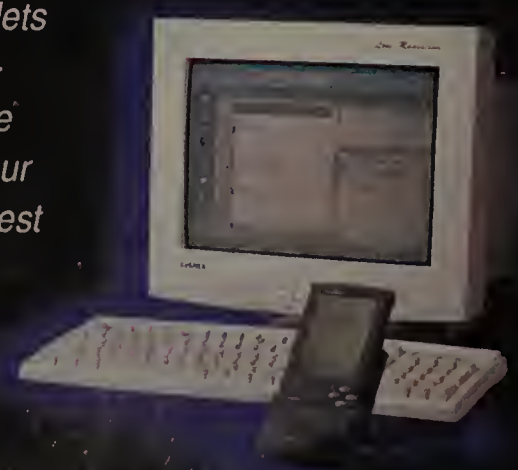

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- MS Windows 95/IE 4.0/IntelliMouse
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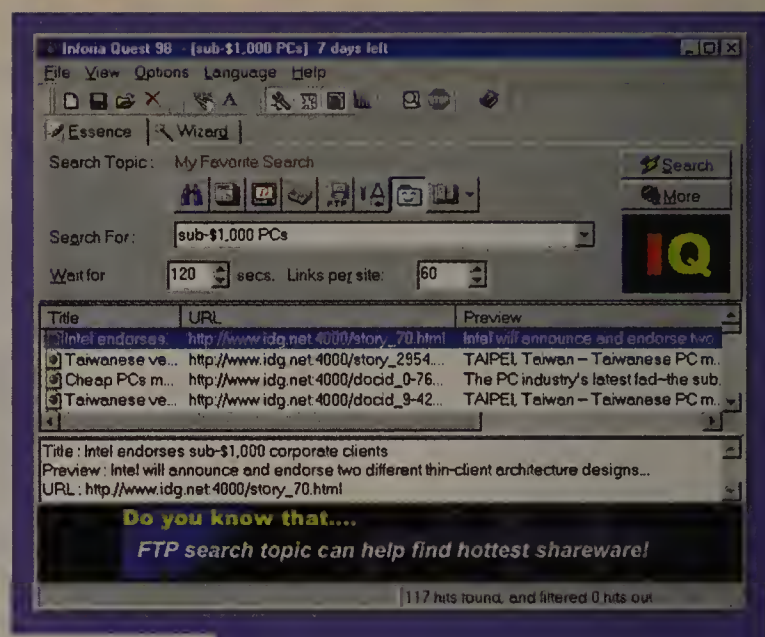
browsing better

DESPITE WHAT YOU may have heard, the Web is not a reference library. It has no Dewey decimal system, no librarian to find that *National Geographic* article for you. Instead, it has dozens of helpful search sites. But must you hit each one? Metasearchers simultaneously search multiple sites—as many as you like, including biggies like AltaVista (www.altavista.digital.com)—and then collate and (ideally) rank the findings. For a simple answer, one site will do; but for big results fast, metasearchers like our favorite, Inforian Quest 98, run the show.

If you've ever been so desperate for a file that you've hit three different sites to see which was fastest, we have your utility: GoZilla, our favorite download manager, picks the speediest FTP search engines.

The big browsers list your favorites and track your travels. But a bookmark manager lets you annotate and organize URLs better. Check out our fave, QuikLink Explorer.

Finally, no pesky Web task is too small to automate. If dialing up your ISP is your least favorite task, for example, let the handy freeware package Dunce do it for you. And to stay connected to any ISP but AOL, use Rascal-Pro. But please be socially responsible; these pingers can tie up an ISP's phone resources, making it difficult for others to log on. So don't use your pinger to stay online while you break for dinner and a ball game.



INFORIAN QUEST 98 gathers its search results as live links, so you can go to a promising site while it continues its work.

METASEARCH TOOLS

Inforian Quest 98

IQ 98 COULD BE renamed IQ 140: Its Mensa-level intelligence makes metasearching simple. By using its themed searches (technology, for example), or by creating your own collection of search sites, you can hunt through hundreds of search engines—the largest number here—on the Web or Usenet. The program has two interfaces: a wizard for beginners, and a single search form for advanced users. Both are simple, and you don't have to wait for all the results to appear before you visit promising sites. Best of all, IQ is $15 cheaper than the next most useful product, WebSleuth. • $25; www.inforian.com; free 30-day demo

Subject Search Spider (SSSpider)

SSSPIDER IS SSSLOW—but worth the wait. Enter keywords, and (unlike other programs) it creates a Web page on your hard disk (including a helpful abstract) of results from up to 200 search robots. This lets you view results offline but still link to them quickly. Also unique: SSSpider lets you group and save searches to repeat later, or run a batch of searches. Lethargy is its drawback: It's slow to load and search, and unlike other products, it won't let you check sites while it's processing. But its relevance-sorted results are easier to interpret and use than most. • $30; www.pkware.com/ssspider; free 15-day demo

WebFerretPro

WEBFERRETPRO is a quick, simple tool that searches up to 20 search engines and returns relevance-rated results in an Explorer-style window. You can search using keywords, Boolean expressions, or phrases. But it's pricey for what it offers. You don't get context for the results—just titles and URLs (though you can menu-surf to get a description of each result, one by one). The freeware version lacks even relevance ratings. • $27; www.ferretsoft.com/netferret; unspecified free demo period

WebSleuth 1.6

WITH A BUILT-IN browser viewer that previews pages, an intelligent sorting method, and a choice of beginner and expert interfaces, WebSleuth is a great metasearcher. Too bad it's so costly. Its wizard helps untutored users, and its results window homes in on the information you want—in part by showing alphabetical lists of words and phrases you can click to preview a result. Like our Best Buy, Inforian Quest 98, WebSleuth ▶

BROWSING gear

ForKeeps
www.fkeeps.com

Attention information pack rats: ForKeeps (by Ragnar Hellspong) archives thousands of e-mail messages and threads from newsgroup or CompuServe forums in its relational database. Once you master its daunting interface, you can retrieve them anytime. Mail, newsgroup, and CompuServe modules cost $39 for one, $64 for two, or $79 for all three; the $50 Pro extension expands the search engine's features and adds other advanced tools.

Spring onto the Internet

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Circle 57 on reader service card.

shows results as they arrive, so you can visit potentially helpful sites before all the results appear. But the program's extra features don't justify its high price. • $40; www.promptsoftware.com; free limited demo

ZurfRider

IT DOESN'T search as many engines (only 30) or offer as many options as Inforian Quest, but ZurfRider is a good choice if $20 is your limit. As with SSSpider, you have to wait until all results are processed before you can look at any of them. But ZurfRider can save search queries for reuse, rare among metasearchers. It also generates additional terms to help refine a failed search. Once you turn off the silly start-up tune, ZurfRider is a fine way to search. • $20; www.zurf.com; free limited demo

DOWNLOAD UTILITIES

GoZilla 2.52

GOZILLA FLATTENS the competition with snappy operation, a slick interface, a low price, and cool sounds. If your browser is already open at a page that shows a file's URL, you can simply drag the URL onto GoZilla. Alternatively, it can find and retrieve files for you—again and again, for as many files as you like. When you're ready to download, the program quickly tests download sites and selects the fastest. Then away it roars (literally emitting a bellow). You can also schedule downloads, and GoZilla will establish and end your connection. A $20 version 3.0, just released at press time, adds such welcome features as a monitor for updates of your favorite programs, and what it calls a "leecher," which keeps trying to connect with a busy site (like Jackhammer on page 182). • $15; www.gozilla.com; free unlimited demo

BROWSING gear

QuickView Plus 4.5

www.inso.com

Inso's QuickView Plus is a more full-featured, commercial version of Windows 95's built-in file viewer. Few of us have every program installed that people use to create files on the Web. This $39 utility reads the file formats of about 200 programs—word processors, spreadsheets, graphics programs, and others—and displays them instantly.

Dipstick 2.5

THOUGH IT'S FREE, Dipstick isn't as good a deal as other download utilities. Rather than finding or downloading files itself, like similar programs that perform these tasks automatically, it merely points you toward sites that have the file you want and tells you how long a download will take. You still have to choose the site and download the file yourself. Dipstick's simple drag-and-drop interface is inviting, but you'll get more comprehensive features from our Best Buy, GoZilla. • Freeware; www.klever.net

Download Butler 1.5a

DOWNLOAD BUTLER is a different kind of utility: It doesn't find and download files for you, but it keeps a record of files you take off the Net. After each download, it asks you to categorize the files and tell it where to store them. If the download includes a setup or install file, Download Butler can automatically run the procedure. If you often lose track of where you've placed your downloads, Download Butler is handy, but $30 seems awfully steep for the services it offers. • $30 shareware; www.lincolnbeach.com; free 7-day trial

File	Size	EstTime	Description	Server(s)	Status
ftp.neosoft.com	N/A	N/A		ftp://ftp.neos...	03/20 05:52
gozilla.htm	8K	00:02		http://www.gi...	03/23 11:55
qle3p1gc.zip	5635K	26:42		50: ftp://ftp.m...	03/20 08:58
sconn133.zip	873K	04:08		51: ftp://ftp.in...	03/14 14:17
search.htm	N/A	N/A		51: ftp://ftp.d...	03/23 11:52

GOZILLA TELLS YOU which sites have the downloads you want and estimates how long it will take to get them from each site.

FtpWolf

FTPWOLF DOES as good a job as the other packages when it comes to finding sites with the fastest download times, but it doesn't match GoZilla's ease of use—or its price. • $25 shareware; www.msw.com.au/fwolf; unspecified free trial period

BOOKMARK MANAGERS

QuikLink Explorer

QUIKLINK EXPLORER is a model utility: helpful, easy-to-use, and inexpensive. The program installs a handy button on Internet Explorer or Netscape; clicking it places your current URL on a comprehensive pop-up list that greatly improves on either major browser's bookmark list. You never again have to leave your browser to get at your URLs. Or you can work directly within QuikLink Explorer to manage and edit your bookmarks even more conveniently. The program comes in three flavors: freeware, standard shareware, and gold shareware. We recommend the standard shareware version over the freeware because of its fine blend of useful features (such as the pop-up list), straightforward interface, and reasonable price. (The ▶

FileMaker Pro keeps Saab at full throttle.

B & B Saab uses FileMaker Pro to keep their business running smoothly.

Over 50 years of blending innovative design with unparalleled advances in driver safety has given Saab a reputation for putting the customer first. And Dietmar Burkhardt, sales manager for B & B Saab in the San Francisco Bay Area, wanted to keep that reputation. "I wanted a system that would give each sales associate every tool they needed for customer service, from inventory to finance information," explains Dietmar. Then he read about FileMaker Pro. "It was under 200 bucks and sounded perfect."

Dietmar incorporated FileMaker® Pro into a Windows NT workstation, easily customizing it to do exactly what B & B Saab needed. Now FileMaker Pro manages all their information from a central location and lets the sales force access it from their desktops. Simple.

USERS USERS EVERYWHERE

Users in businesses of all shapes and sizes manage their data with FileMaker Pro. It brings new information to light, is customizable to your own tastes and preferences, and is incredibly easy to use. Importing spreadsheet data, for example, is as simple as drag and drop.

MANAGING INFORMATION COULDN'T BE EASIER

Dietmar knows: "Before using FileMaker Pro, our sales staff had to run to the sales manager every time they had a question on terms and payment options. Now all the details can be worked out right at their desks. And our customers really appreciate it."

USE YOUR INFORMATION IN WAYS YOU NEVER DREAMED

FileMaker Pro has extensive sorting and reporting capabilities that let you view and utilize your information how you like, from simple mailing labels to a complex inventory system. Spreadsheets just can't do that. What's more, virtually anyone can use it. "The sales force has responded to the system with nothing but praise," says Dietmar.

To get the full story on how FileMaker Pro simplified life for B & B Saab and other organizations, visit us at www.filemaker.com. Or visit your local reseller so you can start using FileMaker Pro right now.

Designed for Microsoft® Windows NT® Windows® 98

Designed for Microsoft® BackOffice™

Mac OS

COMPUSA THE COMPUTER SUPERSTORE computercity Fry's ELECTRONICS MICRO CENTER THE COMPUTER DEPARTMENT STORE

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FileMaker®

gold version claims to offer even more features, but an installation bug kept us from testing it.) • $20 shareware (also available as freeware and $40 gold shareware); www.quiklinks.com; free 30-day trial

BookLock

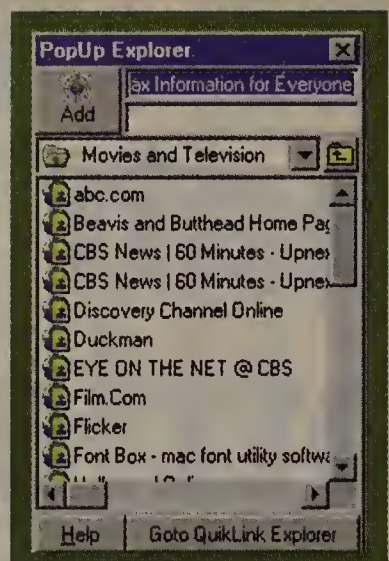
WE DON'T SEE much value in BookLock, which presents you with a ten-page "book" where you can keep a list of site addresses. You have to cut and paste the URLs into the program yourself, since BookLock doesn't enter them automatically, as all the others do. Why should you bother? • $25 shareware; www.gttech.com; unspecified free trial period

Linkman 2.5.1

WE WOULD LIKE to like Linkman—in part because it's free. It sports useful features similar to other programs', such as the option to convert Internet Explorer Favorites into Netscape Bookmarks. But its interface is confusing, with too many buttons and too many soundalike options (such as 'Exit' and 'Terminate'). It's harder to keep track of URLs with Linkman than with a plain browser. • Freeware; www.fortunecity.com/skyscraper/solo/177/download.htm

WebQuick 1.8.1

WEBQUICK, like Quiklink Explorer, works efficiently and in the background. Once launched, it places an icon on your system tray. Though nothing much seems to be happening, WebQuick is actually tracking the sites and pages you're visiting, compiling a list of URLs. Click an icon and you can see up to your last 1500 visits. Organizing URLs is simple, and clicking any entry in WebQuick's list launches your browser (if it isn't running) and takes you to the site. WebQuick can also check which pages have changed or ceased to exist since your last visit, something the major browsers do only if you "subscribe" to a site. Finally, WebQuick lets you yank a site from a long history list into a separate favorites location, another feature the big browsers don't offer. • $30 electronic ($50 retail); www.webquick.com; free 15-day trial



ADDING your current URL to QuikLink Explorer's handy bookmark list is as easy as clicking a button.

WebTabs

WEBTABS IS powerful, convenient—and too costly for what it offers. The version we saw worked better with Netscape than with Internet Explorer. Creating a bookmark is easy, and you can organize your favorites within an Explorer-like interface. WebTabs tracks the URLs you've visited previously or in your current session—*and* your path to each site (something the browsers don't do). Webtabs does a somewhat better job than QuikLink of annotating URLs and searching for keywords inside the notes, but we still think QuikLink is the better value. • $35; www.rballance.com/products; free 30-day trial

CONNECTION AIDS

Dunce 2.52

USEFUL, SIMPLE, and free, Dunce handily automates dial-in tasks. It can bypass the 'Connect To' dialog area, start as many as four Internet programs once you're online, and reconnect you if you get dropped. Dunce also allows you to schedule when you'll connect, and it dials your ISP when a program needs Net access. Setup consists of filling in a dialog box. If you've ever been disconnected moments before completing a big download, you might want to wait for Dunce Gold (release date not yet set), which will add a pinger to prevent your ISP from cutting you off due to inactivity (especially helpful for AOL users). The Gold version will also increase the number of programs you can start and will support more than one dial-up profile—useful if you have several accounts. • Freeware; www.vecdev.com/dunce.html

RascalPro 1.5

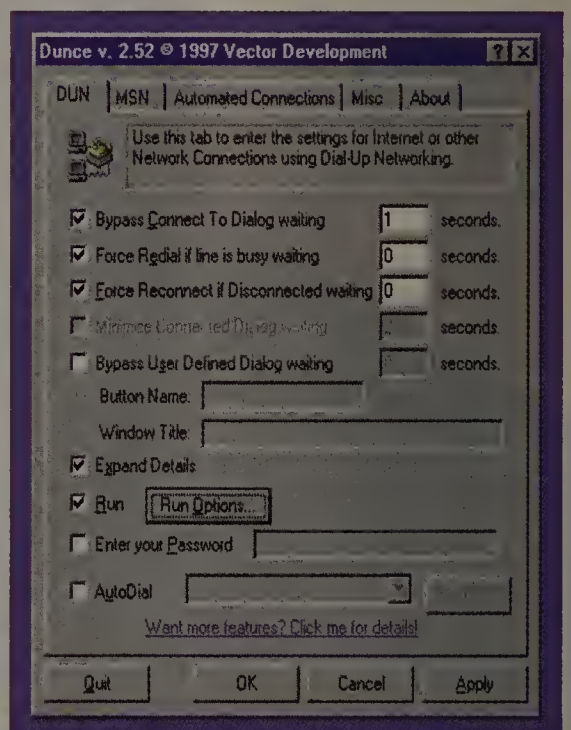
RASCALPRO IS among the best connection aids. Besides supplying a pinger, it dials and hangs up for you, monitors how long you've been connected, and logs useful troubleshooting info such as the type of error that occurred. Like most pingers, though, it doesn't work with AOL, making it less useful than, say, Stay Connected. And unlike Dunce, it ain't free. • $30 shareware; www.basta.com; free 30-day trial

Jackhammer 1.07

JACKHAMMER IS a pinger for Web sites or FTP servers. When you can't get through, it keeps banging until the site lets you in. It can run up to five "hammerings" at once, and even prioritize them. But given its one function, it's pricey. • $25 shareware; www.sausage.com/sitemap; free 14-day trial

Stay Connected 2.0

LIKE SOME other pingers, Stay Connected installs an icon on your system tray; but unlike others, the icon's color changes to show your connection status. It's the only pinger we tested that consistently protects against AOL's sneaky connection dialog box, which can silently pull the plug on your connection. But even so, we urge you not to follow the example of one user ▶



SET UP DUNCE to dial in for you—and automate a range of other pesky Internet tasks along the way.

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THE QL-85G LASER PRINTER MAKES A GREAT IMPRESSION

simply faster. Definitely smaller. Truly exceptional print quality. Samsung's QL-85G is all that, and it's an amazing value. Our new compact laser printer delivers high-speed output of 8 pages per minute and features the Microsoft® Windows® printing system, making the QL-85G another Samsung easy-does-it printer. Even replacing the single-piece toner cartridge is an effortless one-step process. The QL-85G – another smart way for your business to do business. For more information, call us at 1 888 987 4357 or visit our web site at www.samsungtelecom.com **simply connected. simply samsung.**

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SAMSUNG

Circle 207 on reader service card

mentioned in the documentation, who stayed connected for 300 consecutive hours. Other AOL customers deserve a break. • $20 shareware; www.inklineglobal.com; unspecified free trial period

StealthPing 1.2

STEALTHPING is a one-trick pony: Launch it, click *Start*, and from then on it pings away in the background. You can adjust how frequently it pings according to your ISPs' drop time. On AOL, StealthPing isn't quite as consistent as Stay Connected. In the end, StealthPing is too one-dimensional. Dunce does more, for free. • $25 shareware; www.ditr.com; free 10-day trial

BROWSING gear

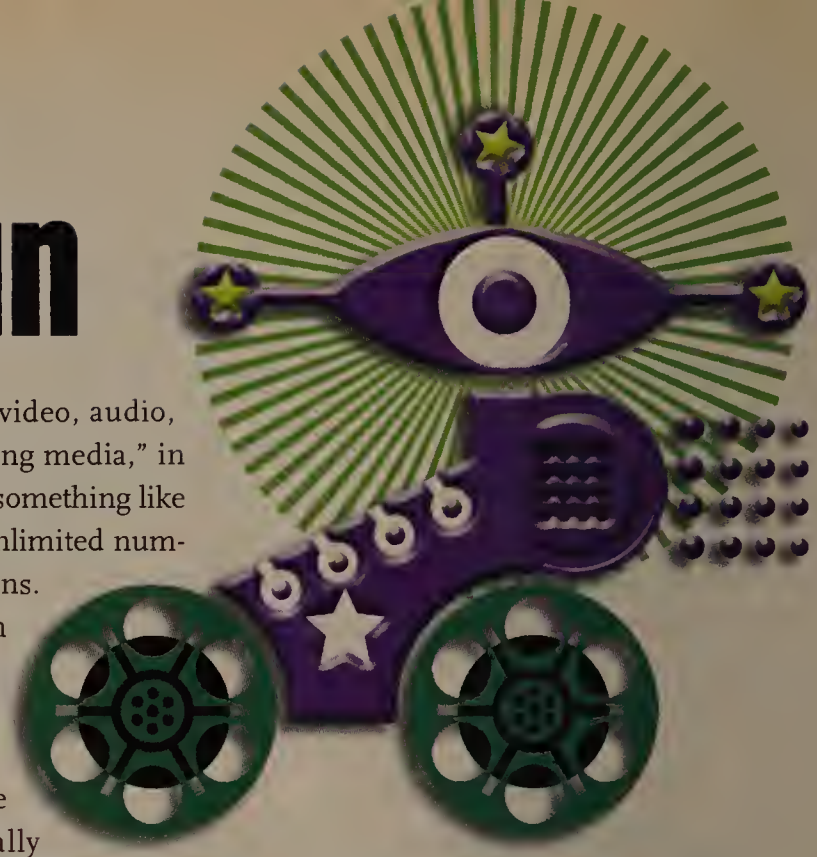
SpamKiller
www.spamkiller.com

The Internet equivalent of getting buttonholed by a drunken boor is suffering a barrage of junk e-mail, or spam. Like a good bouncer, SpamKiller ejects the jerks before they can get in your face. The $30 program from Novasoft prescreens messages from most e-mail packages (not AOL, alas), and deletes any that arrive from several thousand addresses known for originating spam. The SpamKiller blacklist updates itself automatically and you can alert ISPs whose users are sending spam.

WinZip 6.3
www.winzip.com

Almost every Web utility downloads as a compressed zip file, which means you need a sharp unzipping program before you can install them. WinZip, a $29 shareware utility from Nico Mak Computing, helps PC-phobic users zip or unzip with an easy-to-follow wizard. It extracts archived files singly or in groups and checks for viruses before they're released onto your desktop.

browsing fun



FOR SHEER QUANTITY of video, audio, and animation—"streaming media," in Web parlance—the Net is something like cable television with an unlimited number of public-access stations. You can catch homegrown videos of someone else's life, radio stations from Nashville to Tel Aviv, and more—as long as you're not put off by occasionally choppy sound and images. Of course, watching or listening to such an enormous range of content requires player software that plugs into your browser.

Fortunately, most players are free, and you can install as many as you like. A typical installation requires a few steps and may take awhile, depending on how fast your modem is. Moreover, the software can eat up hard disk space. But once you've downloaded all the best players, you're set to experience the finest of the Web. When you click on a button or image, the appropriate player will pop up and play multimedia content, even if the page is still downloading. Here's a list of the essential players.

CosmoPlayer

STUCK IN two dimensions? Gain depth with CosmoPlayer. This free plug-in goes beyond the same old sound, video, and animation and lets you take a 3D look at sites created in VRML (Virtual Reality Modeling Language). As yet, VRML Web sites are rare, but those few look like nothing else. • Freeware; www.cosmosoftware.com

QuickTime

THOUSANDS of Web pages—including a cool one for viewing the inside of the new VW Beetle (www.vw.com/cars/newbeetle/qtvr.htm)—add QuickTime elements to enhance the multimedia experience at their sites. This must-have player lets you enjoy QuickTime-created video, sound, 3D, and virtual-reality Web sites in all their glory. It's also the only free streaming-media product that includes tools for creating content—so you can author your own mini-video. QuickTime Pro, which adds more development tools, costs $30. • Freeware; www.apple.com/quicktime

RealPlayer 5.0

REALPLAYER'S creators, RealNetworks, has a lock on Webcast audio. See its home page for a great directory of more than 650 live broadcasts, such as those at www.npr.org. Its RealPlayer video and audio streamer automatically distinguishes audio from video and opens a movie window for video clips. For $30, RealPlayer Plus offers bookmarking, somewhat better quality, and other conveniences. Most people will be happy with the free version, however. • Freeware; www.real.com

Shockwave Player

TENS OF THOUSANDS of lively Web sites are produced with Shockwave, so this free player is well worth having. It lets you view animations or video created with any of the three popular Macromedia authoring tools—Authorware, Flash, and Director—without prolonged waiting. • Freeware; www.macromedia.com

Products reviewed in this article are available for downloading from PC World Online's FileWorld (www.fileworld.com). Arnie Keller covers Web software for various Macintosh and PC publications. Matt Lake writes frequently for PC World Online. Dan Littman is a regular contributor to PC World. ■

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Modular Bay that accepts variable 20X CD-ROM drive & 3.5" floppy drive (both included)

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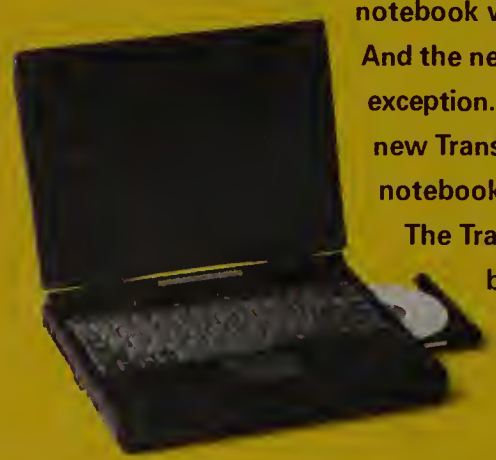
"The TransPort Trek is the fastest budget notebook we've run through our mill"

-PC World, Ranked #1 April '98††

Geeks, experts and industry pundits all agree that Micron makes the world's best notebooks. We've won the coveted *PC Magazine* Editors' Choice award for practically every notebook we've ever released. And the new TransPort Trek is no exception. *PC World* just ranked the new TransPort Trek the #1 budget notebook available today.[1] The TransPort Trek is the single best desktop replacement notebook you can buy.



TransPort® Trek™

Common Features included on all TransPort Systems:

- 512KB L2 pipeline burst cache
- PCI bus with 128-bit graphics accelerator
- USB, parallel, serial, VGA, PS/2, ports
- S-Video Out; MPEG compatible
- CardBus and Zoomed Video ready
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- 2-way infrared port
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Trek 233	Trek 233	Trek 266
• 233MHz Intel Pentium processor with MMX technology • 32MB EDO RAM • 2.1GB hard drive • 12.1" SVGA TFT display	• 233MHz Intel Pentium processor with MMX technology • 32MB EDO RAM • 2.1GB hard drive • 13.3" XGA TFT display • Microsoft Office Small Business Edition • Choice of Portable Software Solutions Pak	• 266MHz Intel Pentium processor with MMX technology • 32MB EDO RAM • 3.2GB hard drive • 13.3" XGA TFT display • Microsoft Office Small Business Edition • Choice of Portable Software Solutions Pak
$1,999 — $70/mo Bus. Lease	$2,499 — $87/mo Bus. Lease	$2,699 — $94/mo Bus. Lease

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Presentation Perfection
GoBook features full S-Video Out as well as Super VGA display and NTSC video ports

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Micron™ GoBook™ is just 1.35" thin and weighs as little as 4.4lbs

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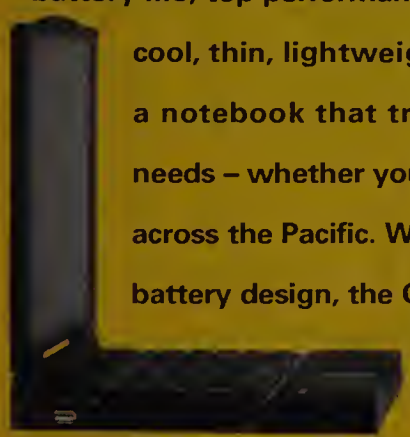
"The GoBook is the notebook by which all others will be measured in 1998!"

Thanks to GoBook, you don't have to compromise anymore. Now you can have a notebook with insane battery life, top performance, all the features and a cool, thin, lightweight form factor in a notebook that transforms to meet your needs – whether you're heading across town or across the Pacific. With its innovative modular battery design, the GoBook notebook offers up to 11 hours of power.



GoBook Portables

Common Features Included on All GoBook Systems:

- 4.4lbs (w/floppy)
- 6.7lbs (w/opt./base battery & floppy)
- 512K L2 pipeline burst cache
- 12.1" SVGA display
- PCI bus with 128-bit graphics
- USB, parallel, serial, VGA, PS/2, NTSC/S-Video, ports
- S-Video Out; MPEG compatible
- CardBus/Zoomed Video ready
- 16 bit stereo/Wavetable sound
- Microphone, stereo line in/out jacks
- 24X modular CD-ROM drive
- 2 Type II or 1 Type III PCMCIA slots
- 2-way infrared port
- Touchpad pointing device
- Modular floppy drive
- Norton Anti-Virus
- System Wizard Mobile Client™
- Microsoft® Windows® 95 and Microsoft Plus!
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GoBook 233	GoBook 233	GoBook 266
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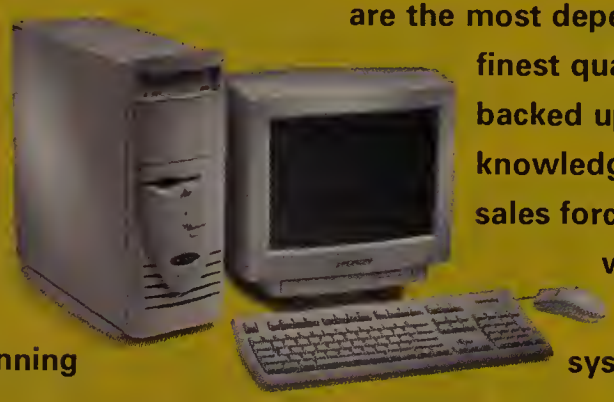

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- 333MHz Intel Pentium II processor
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- 512KB internal cache, 2MB flash BIOS
- 3.5" floppy drive
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- 128-bit AGP Diamond Viper V33D (nVidia), 4MB EDO SGRAM & MPEG
- Integrated 32-voice wavetable 3D stereo sound
- Advent AV009 stereo speakers
- 56K x2 data/fax modem*
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- Microsoft® IntelliMouse®
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- Integrated 100MB Iomega Zip drive

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Millennia 350

- 350MHz Intel Pentium II processor
- 64MB PC100 SDRAM
- 6.40GB Ultra ATA hard drive
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- 82440BX chip set
- 512KB internal cache, 2MB flash BIOS
- 3.5" floppy drive
- 32X EIDE variable speed CD-ROM drive
- 128-bit AGP Diamond Viper V33D (nVidia), 4MB EDO SGRAM & MPEG
- Integrated 64-voice wavetable 3D stereo sound
- Advent AVDD9 stereo speakers
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- 17" Micron 7DDFGx, .26dp monitor (16"display)
- B2440BX chip set
- 512KB internal cache, 2MB flash BIOS
- 3.5" floppy drive
- 32X EIDE variable speed CD-ROM drive
- 128-bit AGP Diamond Viper V330 (nVidia), 4MB EDO SGRAM & MPEG
- Integrated 64-voice wavetable 3D stereo sound
- Advent AV009 stereo speakers
- 56K x2 data/fax modem*
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- Microsoft IntelliMouse
- Microsoft Windows 95 and Microsoft Plus!
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-PC Computing

Small Business Server Solution
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Embedded RAID
- I_2O Ready scalable RAID solution

Dual Pentium® II processor capable

10 Hot-Swap Hard Drives
- Manage your hard drive array without shutting down the system
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- Ultra-wide SCSI
- 10/100 network adapter
- SVGA video

N+1 Redundant Hot-Swap Power Supplies
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Take away the catchy headline. Forget the cute bovine mascot. Ignore the jingle that sticks in your head and look at the product. Look at how it's built, what it costs and how it's supported. That's what really matters, and since 1985 that's all we've focused on. Perhaps that's why Micron was just ranked first among all PC vendors in customer satisfaction by *PC Week* readers. We invite you to compare the numbers for yourself because a better server is the only thing you should be buying.

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Small Business Server Edition

- 266MHz Intel Pentium II processor
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- Integrated Adaptec PCI Ultra-Wide SCSI-3 controller
- Intel EtherExpress Pro 100 network adapter
- 56Kbps x2 US Robotics modem*
- Upgradable to 36GB storage
- Seagate 4/8GB SCSI tape backup drive
- 32X EIDE CD-ROM drive
- Intel LANDesk® Server Manager
- Dedicated server technical support, 7x24
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- 1-year next-business-day on-site service**

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NetFRAME 3100

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- Intel 440BX PCI chip set
- 512KB integrated L2 ECC cache
- 100MHz front side Bus
- Integrated Symbios Ultra-Wide SCSI-3 dual channel controller
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- 5 hot-swap hard drive bays
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- Integrated SVGA graphics (2MB)
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- Intel LANDesk Server Manager
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NetFRAME MV5000

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- Dual processor capable
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- NOS support (3 first-year incident resolutions), 7x24
- 512KB integrated L2 ECC cache
- Memory: ECC, EDO or SDRAM option
- 9 expansion slots: 6 PCI, 2 ISA, 1 shared ISA/PCI
- Dual Integrated Symbios Ultra-Wide SCSI-3 controller, 1 narrow
- Intel EtherExpress Pro 100 network adapter
- 32X EIDE CD-ROM drive
- RAID capable
- 5 internal, hot-pluggable, hard drive array bays (upgradable to 10)
- One 360-watt hot-pluggable power supply standard (upgradable to 3 for added redundancy)
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19"
(18" V.A.)

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Its whoppin' 18" viewable area is more than many "20" monitors. And every inch is scrumptious. With a 0.26-mm dot pitch, 1600 x 1200 resolution. A gazillion colors. And lots of goodies on the side.

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So what'll it be, hon'—kiddie-size or super? Once you decide, call 1-800-888-7320 for your nearest dealer. And hey, you want fries with that?

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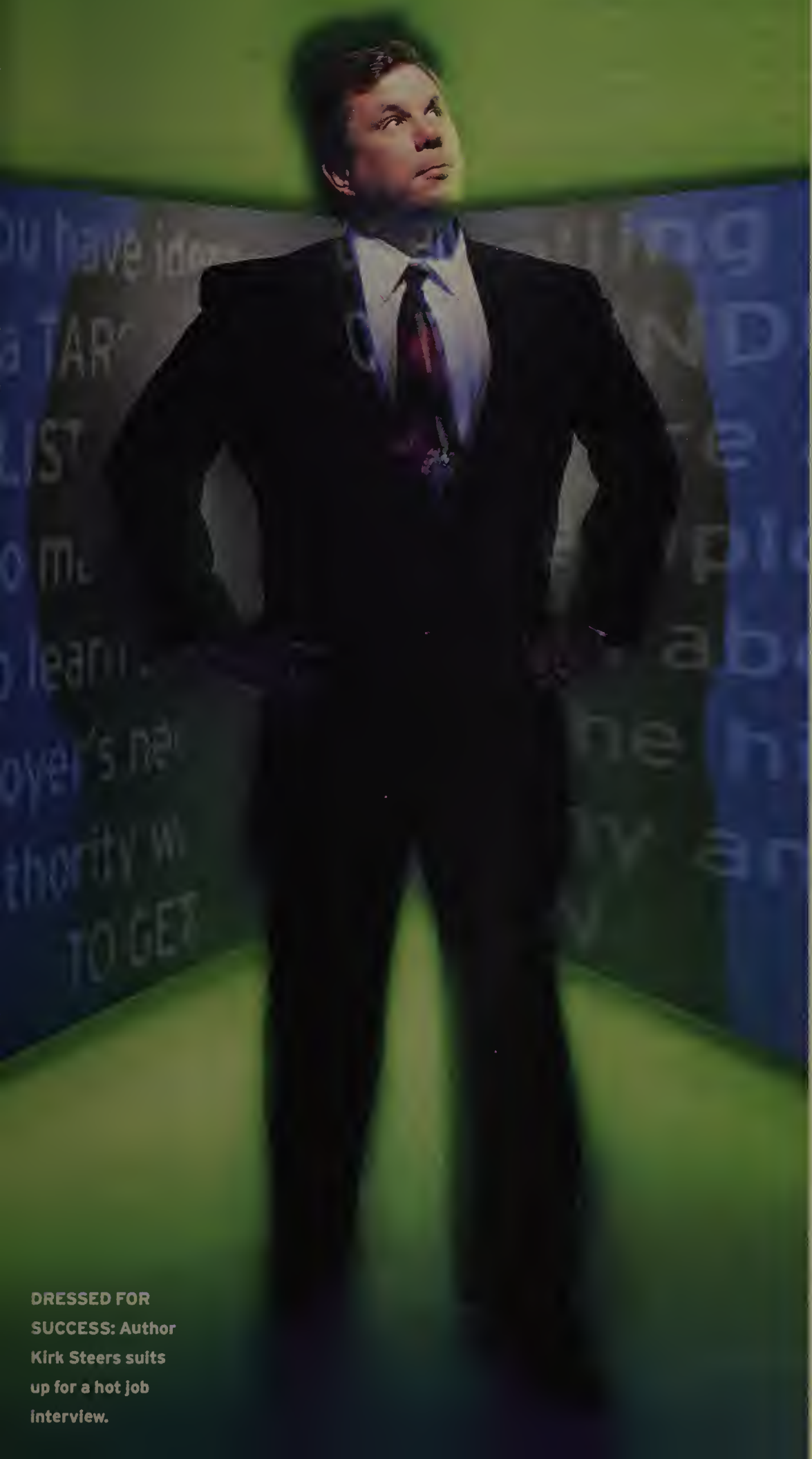
CTX

Get Wired, Get Hired?



DRESSED FOR SUCCESS: Author Kirk Steers suits up for a hot job interview.

ITCHING FOR A JOB CHANGE?

OUR INTREPID REPORTER POUNDED THE VIRTUAL PAVEMENT IN SEARCH OF A NEW GIG—WITH MIXED RESULTS.

BY KIRK STEERS

PHOTOGRAPHS BY ROB CARDIN

I'D FINISHED my morning latte, read the newspapers, and was easing into my desk chair when the phone rang. It was my editor, wondering where that story was I'd promised her yesterday. As I conjured up a plausible excuse, I scanned my e-mail. More editors, more projects, more headaches. Instinctively I went online and checked my bank balance: It was hovering dangerously close to room temperature. Something inside me snapped. I needed a new job. And I needed it now. ▶

I knew I wanted to make a lateral move back into the business world. But how? My last job search—four years ago—was a full-time job in itself. I spent three months poring over newspaper ads, writing letters, and doing informational interviews before I got my first nibble.

I didn't have time for any of that. So I turned to the Internet. Using the Web, I could scan job listings, search for jobs meeting my exact requirements, and have the sites send me e-mail when my dream job opened up. And if the stories I'd heard were true, recruiters would see my electronic résumé and beat a path to my door. (Not exactly how it turned out—more on that later.)

My first impulse was to jump right in. So I dredged up an old résumé, updated it with a few fresh exaggerations, and looked for a place on the Internet to post it. Then I realized I had a problem: There were literally thousands of sites that dealt with finding a job—from monstrous, ad-driven bulletin boards down to small, college-based career centers. I had no idea which sites were best.

It was starting to feel like the job searches of old. I needed a strategy. And fast.

RESEARCH, RESEARCH, AND MORE RESEARCH

FIRST, I TOOK A mental step backward. During my last job search I'd read *What Color Is Your Parachute?* by Richard Nelson Bolles, and it had served me well. So I fired up Alta Vista and tracked down the **What Color Is Your Parachute** page (www.washingtonpost.com/wp-adv/classifieds/careerpost/parachute/paraframi.htm). It was exactly what I'd been looking for: a gateway to online job hunting.

Like dozens of similar gateways, the Parachute site covers all the usual topics—résumés, career counseling, company research, contacts, and the Holy Grail of the Internet job search, free employment listings. Tempted as I was to plunge straight into the listings, I opted instead for a little online career advice. The Parachute site's counseling section linked me to the home page of **JobSmart** (www.jobsmart.org), whose "What Do I Want" section offered several personality tests. I filled out the Keirsey Temperament Sorter and learned that despite my two years of Machiavellian Business Administration training, I'm actually an "Idealist-Healer." Yeah, right. The test also revealed one of my character flaws—impatience. I moved on.

Given my background, I decided to target two types of positions: financial or industry analyst, and software or hardware product marketing manager. Following Bolles's advice, I focused first on the "hidden job market"—the 80 percent of openings that get filled without ever being advertised. That meant finding companies I wanted to work for and then developing contacts that would get me in the door.

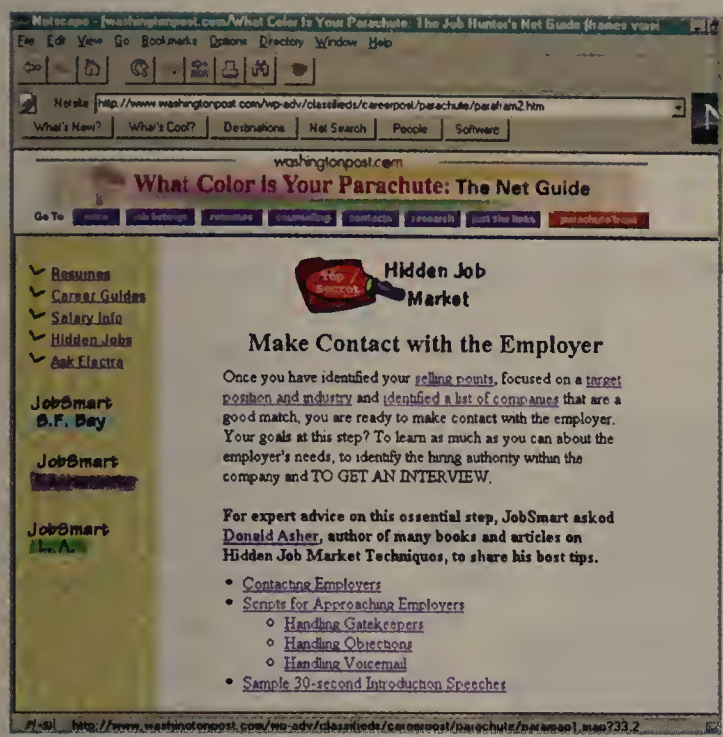
MAKE CONTACTS

THE NEXT STEP WAS to find out which companies were hot and hiring. I started by looking for background info on high-tech marketing. One great tool I found was **The List of Lists** (www.catalog.com/vivian/interest-group-search.html). It lets you search mailing lists (e-mail–based discussion groups on all kinds of topics) and tells you how to subscribe to them. A search on the keyword *marketing* connected me to High Tech Marketing Communications, a mailing list of over a thousand members

GOOD JOB HUNTING: 12 TOP SITES TO START YOUR SEARCH

			IF YOU'RE LOOKING FOR A JOB					IF YOU'RE TRYING TO FILL A		
SITE	Jobs listed (4/28/98)	Job search by	Résumé-building template	Job search agent (e-mail)	Online tips and advice	Forum/ discussion group	Bulletin board résumés	Monthly cost per single posting	Cost to browse résumé bank	New candidate notice (e-mail)
CareerBuilder* www.careerbuilder.com	6000	J, K, L, S	○	●	●	○	○	$150	n/a	●
CareerMosaic www.careermosaic.com	70,000	C, J, K, L	●	○	●	○	●	$150	free	○
Cool Works www.coolworks.com	40,000	J, L	○	○	○	○	○	$50	n/a	○
E.span www.espan.com	17,000	C, J, L	●	●	●	○	●	$75[1]	$2250[2,3]	●
Hot Jobs www.hotjobs.com	6000	J, K, L	●	●	●	●	●	$80	n/a	●
JobBank USA www.jobbankusa.com	2000	J, K, L	●	●	●	○	●	$64[1]	$1900[2]	○
JobCenter www.jobcenter.com	13,000	K	●	●	●	○	●[4]	$60[5]	free	●
Jobfinder.com www.jobfinder.com	200	J, L	●	○	○	●	●	free	free	○
JobWeb www.jobweb.org	3000	K, L	○	○	●	●	○	$80	n/a	○
The Monster Board* www.monster.com	50,000	J, K, L	●	●	●	○	●	$88	$4900[2]	●
Online Career Center www.occ.com	81,000	K, L	●	○	●	●	●	$150	free	●
Yahoo Classifieds www.classifieds.yahoo.com	200,000	K, L	○	○	○	○	●	free	free	○

*Recommended sites C = Company; J = Job type; K = Keyword; L = Location; S = Salary ● = Yes ○ = No n/a = not applicable [1] Minimum two months. [2] Per year.



A GREAT PLACE TO START: What Color Is Your Parachute (see Step 1) provides links to advice centers like JobSmart, which offers tips on getting your foot in the door with employers that don't advertise their job postings.

that provides informative discussions on industry trends, as well as the occasional job posting.

I discovered that mailing lists and newsgroups are also a mother lode of e-mail addresses for potential contacts. But I realized that you need to use this information judiciously: Blindly contacting people can do more harm than good if the recipient thinks you've obtained the address improperly—say, from a tightly controlled newsgroup or mailing list.

Professional societies and organizations are also useful places for making contacts. **Yahoo** has a good list at www.yahoo.com/Business_and_Economy/Organizations. And for researching a specific company, **Yahoo's Companies Directory** (www.yahoo.com/Business_and_Economy/Companies/Directories) isn't bad either. If it's a publicly traded company, stop by the federal government's **EDGAR database** (www.sec.gov/edgarhp.htm) for a wealth of free information about a company's fiscal fitness.

Finally, don't forget about your alma mater. Some of the best job sites are associated with colleges and universities. I found a very useful alumni database at my graduate school's site. The database eventually put me in touch with two old drinking buddies who are now well-placed in different fields, one of them in marketing, the other in finance.

But I'd had it with long-term planning and research. I was itching for some immediate gratification. I popped the top on some Ben & Jerry's Cherry Garcia and went straight to the online job listings.

SCAN THE LISTINGS

THE HARDEST PART of looking for a job online is knowing where to start. I began my search at **JobWeb** (www.jobweb.org/catapult/jgenlst.htm), which offers a well-organized list of links to nearly a hundred other job sites, broken down by region.

Thanks to an annoying but obviously effective advertising campaign, one name caught my eye, **The Monster Board** (www.monster.com). Like **CareerMosaic** (www.careermosaic.com) and **Online Career Center** (www.occ.com), The Monster Board offers lots of listings—the first day I looked, it listed 37,000 positions. Yikes!

Fortunately, some of the most practical sites, including **CareerBuilder** (www.careerbuilder.com) and The Monster Board, let you search by location, job category, and keyword (like *project manager* or *accountant*). I started with a simple keyword search on *analyst* and *marketing*. Results varied wildly from site to site. While Monster Board and CareerMosaic returned thousands of listings for each search, Jobfinder.com (www.jobfinder.com) returned exactly five hits. On The Monster Board and CareerMosaic, refining the search by location (San Francisco and Hawaii—hey, I can dream, can't I?) proved extremely helpful, winnowing a few thousand job listings to a few hundred.

On the other hand, I found searching by job category too limiting. The Monster Board had the best categories: I could search listings for four different types of analyst, including the catchall *other-analyst*. But more than three-quarters of ▶

FEATURES COMPARISON

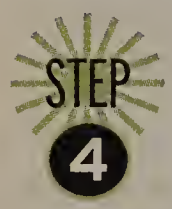
POSITION

Employer information	Links to employer URLs	Comments
●	●	Tons of career info, supereasy to navigate, résumé posting across affiliated network.
○	●	High-traffic site has tips on ASCII résumés, business and tech listings, helpful Career Center.
●	●	Great source for fun, adventurous, and generally unconventional jobs.
●	●	Heavy technical flavor in listings, limited career resources. Résumé builder has editing capabilities.
●	●	Technically oriented job listings, easy-to-use search interface.
●	●	Search capability for over 20 job sites. Helpful lists of Usenet groups and newspaper links.
●	●	No bells and whistles, just basic job listings and résumé posting.
○	○	Standard job and résumé postings. Very new at time of writing—not many listings.
●	●	National Association of Colleges and Employers' site has own listings plus links to useful sites.
●	●	Has lots of listings and résumés. Job alert service was not working correctly at press time.
●	●	Big site has tons of listings, especially for technical and finance positions.
○	●	Many job listings but hard to navigate. Résumé posting is more of a "position sought" classified ad.

[3] Varies according to subscription. [4] $5 for six months. [5] $30 for two-week minimum.

the analyst jobs I saw on all the sites were for technical positions that often required a "thorough knowledge" of VSAM, SQL, or other dweebish acronyms. Still, I did find four financial and business analyst listings on my first pass through Monster Board, and three more on CareerMosaic. I jotted down the contact information and kept searching.

THINK SMALL, THINK LOCAL



"GOLD," my grandfather once told me, "is where you find it. Dig everywhere." So I decided to see how some of the smaller, more specialized sites would pan out.

First stop: regional listings close to my home. The **List Foundation** (www.listfoundation.org), a San Francisco Bay Area site informally known as Craig's List, was a real find, with lots of nontechnical jobs and a fair number of entry-level positions. Craig's List is currently expanding nationally. It's free to job seekers and charges employers a relatively cheap $25 per posting.

Job-related Usenet newsgroups are also good resources. I used **Deja News** (www.dejanews.com), a newsgroup search engine, to sort through hundreds of postings. A few newsgroups, such as **us.jobs.offered** and **alt.jobs**, work nationally, and some cater to a specific profession like programming (**prg.jobs**) or biology (**bionet.jobs**). In general, most of the jobs listed in the newsgroups were very technical, and the most useful newsgroups were the regional ones.

I didn't want to miss any companies not yet on the Net, so I scanned online newspaper classifieds. **Newspapers Online** (www.newspapers.com) has links to publications worldwide. Even better, **CareerPath.com** has a search engine for the classified ads of over 50 U.S. papers. It led me to several analyst positions I hadn't seen online.

Finally, hundreds of other specialty sites cover everything from government jobs (**www.fedjobs.com**) to aerospace positions (**www.spacejobs.com**). And who knows what I'd be doing if I'd seen the **Cool Works** site (www.coolworks.com) four years ago. Cool Works specializes in—well, *cool* jobs: I'm still tempted by its listings for an Alaskan bush pilot and a trailer park manager in Roswell, New Mexico.

But searching all these sites took me hours. I couldn't see myself checking every site every day for new listings. Fortunately, for some sites I didn't have to.

GET AN (ELECTRONIC) AGENT

HERE, I THOUGHT, is where Internet job hunting would really shine: Some sites offer handy (and free) search agents that automatically scour new postings, save them to your personal folder on the site, and e-mail you when your ideal job appears. You simply type your desired job location, salary, and keywords, and bingo—suitable job listings will pop up in your in-box. At least, that's the idea. My results were somewhat mixed.

I signed on for The Monster Board's agent and didn't receive any listings for weeks. An e-mail message I sent the site's tech support brought an apology explaining that they were simply overwhelmed by the volume of use. But I was still able to go to the site and manually view the jobs saved for me in my personal folder. As it turned out, two weeks had brought hundreds of listings, mostly looking for technical analysts. But only five of them merited a reply. I definitely needed to narrow my search criteria. CareerBuilder's Personal Search Agent, meanwhile, worked very well from the get-go. It fed me three or four listings a day, which usually yielded one worthwhile listing per week. The 15 or more mailings I got from Craig's List each day yielded only a few openings over a four-week period—most of them for entry-level or administrative positions.

But by now, things were really starting to roll. I'd already found a number of good job possibilities, and thanks to my own personal search agents, I had more e-mail listings coming in every day. It was time to send some responses. ▶

Format a Killer Online Résumé

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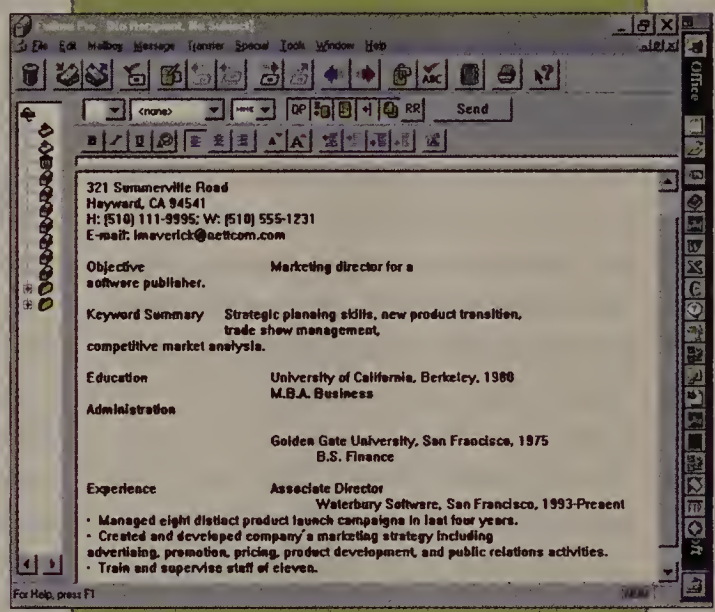
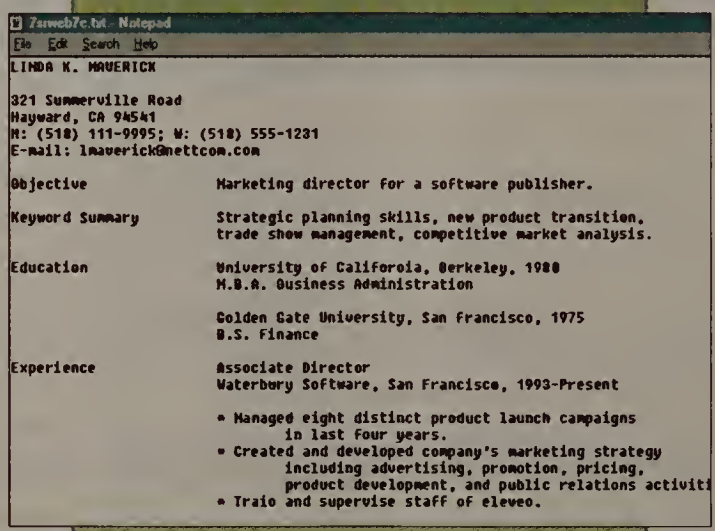
E-mail lmaverick@nettcom.com

Objective	Marketing director for a software publisher.
Keyword Summary	Strategic planning skills, new product transition, trade show management, competitive market analysis.
Education	University of California, Berkeley, 1980 M.B.A. Business Administration Golden Gate University, San Francisco, 1975 B S Finance
Experience	Associate Director Waterbury Software, San Francisco, 1993-Present

BEFORE: This is how your résumé looks in a good ol' Microsoft Word document. But be warned: Your fancy formatting will probably disappear when you post your résumé online.



AFTER: See what happens when you paste your résumé into the body of an e-mail? Odds are that the receiver at the other end will get scattered text that's hard to read.



SOLUTION: Save your original as an ASCII text file. Preserve the line breaks and keep your descriptions short. (See Step 6.)

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Scan to the web with:

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- *Includes Adobe Acrobat 3.0, Photoshop LE, PageMill, Imaging Professional from Eastman Software*
- *SCSI host adapter included*
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YOU POSTED THE RESUMÉS RECEIVED BY HR ONTO THE INTRANET.

YOU DISTRIBUTED THE NEW DESIGN SPECS TO THE FIELD SERVICE TECHNICIANS.

YOU PUBLISHED MARKETING'S COLOR DATA SHEETS ONTO THE COMPANY WEBSITE.

(And you just took the scanner out of the box an hour ago.)

The ScanPartner® 600C means business right out of the box. It's the Internet/intranet-ready desktop scanner designed to tackle the high demands of today's dynamic websites. The only one in its class, we might add, that comes standard with an automatic document feeder for hands free scanning. So if you were armed with one, you'd be able to catapult up to 500 pages a day or more onto the web. Speed aside, the ScanPartner 600C is also versatile. It scans documents as small as 1"x 1", and as large as legal size at 600 dpi for color applications. We've also included all the software you'll need to scan to the web or anywhere else: Adobe® Acrobat® 3.0, Photoshop® LE, PageMill™ and Imaging Professional from Eastman™ Software. And, the ScanPartner's priced at only $1795.* All with our No Excuses™ limited warranty: Our promise that in the unlikely event your scanner fails, you'll get a replacement in two business days. The ScanPartner 600C. Open the box. Scan to the web. To learn more, give us a call, or visit our website.

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All The Training You Need To Buy Interactive Training

Technology keeps changing. Your people have to keep up with it. And self-paced training via computer seems the logical choice because it:

- Works around individual time schedules
- Provides training in remote locations
- Offers "just in time" refresher training
- And lets people learn at their own pace.

But how do you choose the right training?

Know what you're looking for

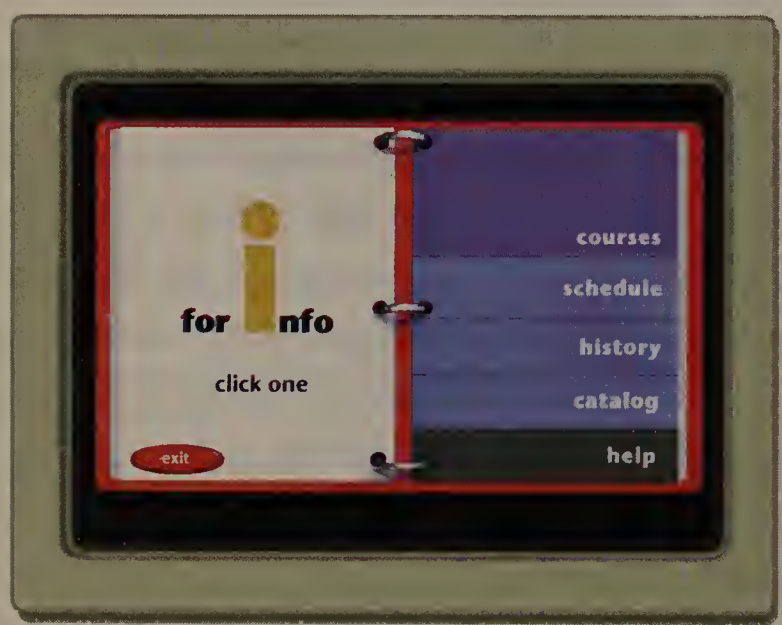
Interactive training. Computer-based training. Multimedia training. Internet-based training.

Confusing, isn't it?

But don't lose sight of what you are ultimately looking for...

1. Effective training
2. Delivered by computer
3. That's easy to use
4. And cost effective.

Your best choice will be the product that best satisfies these basic criteria.



Choose truly interactive training that's well organized and easy for people to use at their own desktop.

Choose what people will use

You can't bore people into learning. So don't be afraid to test drive and compare courses from different companies. You'll instinctively gravitate to those with:

- Menus and features that make navigating the course easy
- Animation, sound and other multimedia to spark interest
- Information that's simple to understand
- Return and review capabilities.

All this gives students the freedom to skip features they already know. Go back and review something they're not clear on. And quickly gain the skills they need in an exciting multimedia environment.

Look for learning geared toward adults

Interactive courses need to present material in ways people in the workplace learn best.

The best training is based on a proven adult learning methodology that involves three distinct elements:

1. ***Meet it.***
2. ***Learn it.***
3. ***Try it.***

First, students are introduced to the subject, and find out what they will be learning.

Next, an automated demonstration shows exactly how to perform the task.

Finally, students are asked to try what they've just learned and are given immediate feedback. Simple...and highly effective.

*In fact, students learn up to 60% faster and retain more with interactive training than with traditional classroom training.**

**Source: Multimedia Monitor, July, 1995*

Flexible delivery should include CD-ROM, LAN or corporate Intranet.

Insist on true multimedia

Not everyone learns the same way. Some people rely on visual information.

Others learn more from sound or hands-on interaction.

So the courses you choose should be extremely interactive. They should have high resolution text, graphics and animation for visual appeal. Narration and sound effects to grab attention. And authentic software simulations for "hands-on" experience.

That training should also offer flexible delivery via CD-ROM, LAN or corporate Intranet.

Make sure you can measure results

Want to know what you're getting for your training dollar? Then choose interactive training that truly tests each student's ability to use their software. And also provides tracking software you can use to manage your training program.

Today's Most Popular Desktop Software	***SPIRE's Most Popular Training Courses***
WORD	WORD
EXCEL	EXCEL
POWERPOINT	POWERPOINT
OUTLOOK	OUTLOOK
ACCESS	ACCESS

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Pay for only what you need

Why buy access to an entire library when, realistically, you will only use a limited number of titles? Look at your company's IT training needs. Then choose a training supplier that will provide exactly the right courses to meet them — without an expensive all-inclusive contract.

Work with the experts

Some companies simply take existing text or video courses and shoe horn them into a computerized format.

But Spire Inc. designs their courses from the ground up to take full advantage of the multimedia environment. For years, Spire has developed interactive multimedia courses for one of the largest classroom training companies in the world.

So we have more experience in the field than just about anyone. And we'll be glad to answer any questions you may have.

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Before you make your training decision, call for a free Spire interactive training demonstration — and keep this free assessment software on CD as our gift.

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Or visit our Web site at **www.spire-inc.com.**

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CRAFT THAT RÉSUMÉ

BEFORE I COULD apply for any job, I needed a good résumé. I found out that a good electronic record of my job history was not the same animal as its paper-bound cousin.

During my last job search, I spent many painful hours perfecting my résumé: adjusting the structure, finding the perfect typefaces, even choosing a high-quality paper with colorings named after deciduous trees. But my online résumé was as likely to be read by a computer as by a person. So paper with matching envelopes and 12-point Times Roman type were out. Simplicity and substance were in.

What I needed was a good ASCII text version of my current résumé, one that I could easily carve into pieces or cut and paste as a whole. So I launched Micro- ▶

Hire Grounds: Recruiting on the Web

IT'S NERVE-RACKING. You've identified a worthy job candidate, checked all the references, and now you're starting the interview. You smile confidently as you enter the room, trying hard to hide your desperation; you really need to hire someone, *now*.

Rapid Recruitment

IN TODAY'S booming economy, good employees—especially those with technical or programming skills—are hard to find. And they don't stay unemployed for very long. That's why more companies are turning to the Internet for their recruiting needs.

"It's instant gratification," says Darrin Podeschi, director of corporate human resources for Dallas-based Quaker State. "We hire most of our tech people off the Web. It's fast and very efficient."

Recruiters agree that using the Net is far more cost-effective than advertising in newspapers. "Posting a position online costs us a small fraction of the $8000 to $16,000 we would spend for a one-shot ad in a major newspaper," says Rosanna Durruthy, vice president of recruiting and relocation for Blockbuster Video in Dallas. "And our posting is out there 24-7," she adds.

A single Web job posting typically costs less than $200 for up to two months on the bigger job boards. Other sites are cheaper still—JobCenter charges $30 for two weeks. And some sites, such as Yahoo Classifieds (www.classifieds.yahoo.com) or specialists like Aquatic Science Jobs (aslo.org/jobs.html), are free.

Search and Employ

ONCE YOUR company signs up with a job site, the actual posting mechanism is simple: Employers fill in the appropriate templates for job description, contact information, and company profile.

Doug Halm, employment manager at Recreational Equipment Incorporated in the Seattle area, urges employers not to forget about using their own company's Web site as a recruiting ground. "We had the best luck with the REI Web site," he notes. "We like to hire people with a personal connection to the outdoors. Our site brings those people to us."

Recruiters can also scan pools of job seekers' résumés by keyword and salary range. JobCenter, CareerMosaic, and Yahoo offer this service for free, while one year's access to The Monster Board's résumé bank costs $4900. However, The Monster Board and CareerBuilder offer search agents that notify subscribing employers of résumés that meet their search criteria.

EMPLOYER DARRIN PODESCHI'S mantra is "kill paper." Using the Net automates and speeds up the recruitment process, he finds.

Local Talent

SOME EMPLOYERS may not want the expense—or the exposure—of a national site. Amy Harmsen, human resources manager for Just in Time Solutions, a start-up software company in San Francisco, learned this lesson by trial and error.

"There's a lot of baggage that comes with posting on sites like The Monster Board and CareerMosaic," she says. "These sites are great if you have a big staff, but they're expensive, and they brought us more résumés than we had the time to process. I also had to deal with a frustrating number of calls from headhunters who pounced on our postings first."

Harmsen had better luck with regional job sites such as Craig's List. "It was loaded with technical talent, and best of all, it was local," reports Harmsen. "We weren't chasing after qualified candidates that lived on the East Coast and had no intention of moving. With Monster Board and CareerMosaic, that was a problem."

Bye-Bye Classifieds?

SO ARE newspaper classified ads a thing of the past? "Not yet," says Macy Fecto, director of human resources at the publisher Miller Freeman in San Francisco. "About 70 percent of our hires still come from newspapers."

And what about the millions of potential employees not yet using the Net? "They'll be there eventually," says Quaker State's Podeschi. "But for certain jobs, I'm not sure I want a new employee who's not already online."

PHOTOGRAPH: DANNY TURNER

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***NEW* DELL DIMENSION XPS R400** **400MHz PENTIUM® II PROCESSOR** FEATURING MMX™ TECHNOLOGY	***NEW* DELL DIMENSION XPS R400** **400MHz PENTIUM II PROCESSOR** FEATURING MMX TECHNOLOGY	***NEW* DELL DIMENSION XPS R350** **350MHz PENTIUM II PROCESSOR** FEATURING MMX TECHNOLOGY	***NEW* DELL DIMENSION XPS R350** **350MHz PENTIUM II PROCESSOR** FEATURING MMX TECHNOLOGY
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$3699 Business Lease◊: $136/Mo., 36 Mos. Order Code #590601	**$2999** Business Lease◊: $114/Mo., 36 Mos. Order Code #590605	**$2499** Business Lease◊: $95/Mo., 36 Mos. Order Code #590606	**$2199** Business Lease◊: $83/Mo., 36 Mos. Order Code #590603

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DELL INSPIRON NOTEBOOKS

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***NEW* DELL INSPIRON 3200 D266XT** **266MHz PENTIUM II PROCESSOR** FEATURING MMX TECHNOLOGY	***NEW* DELL INSPIRON 3200 D266XT** **266MHz PENTIUM II PROCESSOR** FEATURING MMX TECHNOLOGY	***NEW* DELL INSPIRON 3200 D233XT** **233MHz PENTIUM II PROCESSOR** FEATURING MMX TECHNOLOGY	**DELL INSPIRON 3000 M200ST** **200MHz PENTIUM PROCESSOR** WITH MMX TECHNOLOGY
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$3799 Business Lease◊: $140/Mo., 36 Mos. Order Code #890601	**$3199** Business Lease◊: $118/Mo., 36 Mos. Order Code #890607	**$2699** Business Lease◊: $102/Mo., 36 Mos. Order Code #890617	**$2199** Business Lease◊: $83/Mo., 36 Mos. Order Code #890623

Reference the appropriate order code to receive featured configuration and pricing.

intel inside pentium® II PROCESSOR

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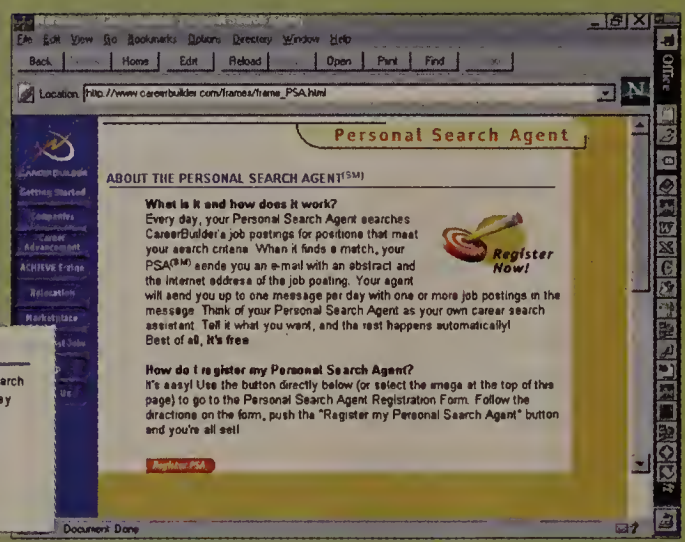
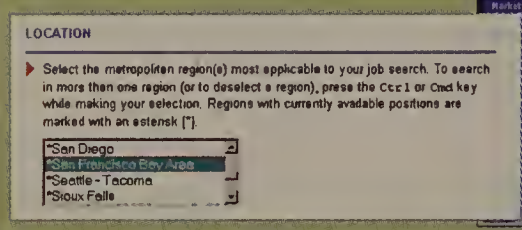
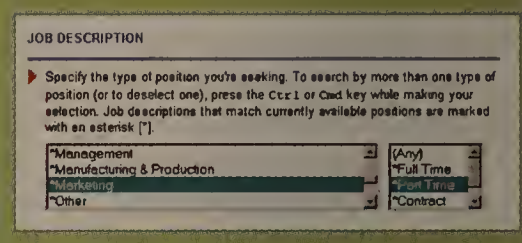
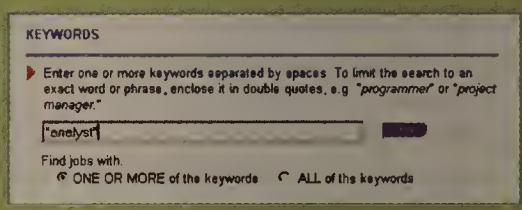
Work the Web

TIRED OF SCANNING THE LISTINGS? CareerBuilder's Personal Search Agent (see Step 5) delivers hot postings to your desktop via e-mail. Be sure to specify your desired location and position, and a keyword.









soft Word, opened my lovingly formatted résumé, and saved it as a 'Text only (*.txt)' file. What I saw on screen was not pretty: Big blocks of text were smushed together into nearly unreadable blobs. I knew I needed help.

CareerBuilder, Online Career Center, and the Parachute site offer guides—or links to guides—to writing a good online (or paper) résumé. The most helpful site I found was JobSmart, which is loaded with sound advice. The ERésumés 101 tutorial at **Rebecca Smith's ERésumés & Resources** (www.eresumes.com/tut_eresume.html) also gave lots of useful tips.

Heeding the advice of ERésumés 101, I kept my résumé simple. I inserted empty lines to set off paragraphs and sections, and used capital letters for job titles and company names. What I ended up with wasn't gorgeous, but it was easy to read and navigate.

I was happy with the results, but I also knew that I should test them. So I pasted my new résumé into an e-mail message and applied to myself for a job. The cover letter I'd typed in the Eudora mail program looked fine (I really liked this candidate), but the résumé itself was a total disaster—sentences spilled over into the next lines, making it nearly impossible to read. (No job for this doofus!)

What had happened? Saving my résumé in .txt format had retained Word's word-wrap feature. I had to save the file as 'Text only with line breaks'. Also, Word kept the same small font with over 80 characters per line—too long for my e-mail. I inserted the line breaks, changed the font, and the résumé looked fine.

Finally, on the advice of several Web sites, I added a *keyword summary*—a block of words appearing at the top of my résumé. If you're sending your résumé to a large company or a headhunter that receives lots of them, the first "person" to read it will likely be a computer looking for specific keywords. So you need the right ones for a particular job. Rebecca Smith's ERésumés & Resources can help; it provides lists of keywords for many types of occupations.

POST AND TOAST

NOW I could do more than just respond to ads; I could post my résumé to the online abyss and see if any employers would actually come to me. Almost all job sites offer this service for free; **JobCenter** (www.jobcenter.com) charges $5 for the privilege.

Posting a résumé usually involves filling out an online form or résumé-building template. The Monster Board site, for instance, lets you paste each section of your résumé into separate on-screen boxes.

Less elaborate sites have you dump ▶

Top Tips for Job Hunters

LOOK BEYOND THE LISTINGS. Most positions are filled before they're ever posted. So use online resources to develop contacts and sniff out hidden opportunities, in addition to scanning recruitment listings and posting your electronic résumé.

DO YOUR HOMEWORK. Use the Net to research target companies and industry trends. Adding a savvy reference about the company or a viewpoint about its market direction can make your cover letter and résumé stand out from the competition.

CHOOSE THE RIGHT KEYWORDS. Make sure you back up each keyword with substance in the body of your résumé. Plugging in trendy keywords that don't relate to your experience will do nothing but annoy a harried human resources person.

ASCII AND YOU SHALL RECEIVE. Make a simple text-only version of your résumé. But don't e-mail it as an attached file—you don't know what e-mail program the recruiter will have, and file attachments can get completely garbled or lost.

STAY ORGANIZED. Keep a written record of what you have posted, where you posted it, and the log-on name and password you used. With so many sites out there, it's easy to lose track. At some point, you will have to remove your résumé or unsubscribe from a search agent to put an end to the e-mail messages and telephone calls.

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your whole résumé into a single field.

The posting process can be very time-consuming. First, each of the dozen sites I used asked me to log on with a user name and password. Because I was constantly visiting sites to post, edit, and send résumés, I learned an important lesson: Use the same log-on name and password for every site. It'll save you loads of time.

And with so many sites, entering the résumé data takes time too. The procedure was similar for all the sites I used: I entered my personal info and maybe some key parameters like desired salary or location, then pasted all or part of my résumé into the site's template. After posting all my "analyst" résumés, I didn't relish the thought of doing it all again for a slightly different version aimed at a marketing position. Fortunately, I didn't have to.

A $50 software product called **WebResume** (MySoftware Company, 800/325-3508, www.mysoftware.com) includes a résumé-posting wizard that lets you enter all your data once and send it simultaneously to ten national sites. I fired it up, and within 10 minutes I had done what normally would have taken a couple of hours.

AND THE KEYWORD IS...UNEMPLOYMENT

FROM WHAT I'D HEARD, posting a résumé on the Internet is like a visit to Candyland. I had loads of experience and a number of skills to offer. *And* I'd posted to over ten different sites. I'd just have to sit back and wait for offers to rush in. I was even a little worried I'd be flooded with phone calls and e-mail from headhunters who prowled the online bulletin boards.

I received exactly one phone call. Ouch!

I ran this humbling result by several job recruiters and received some valuable insights. Most of the recruiters I spoke with said they don't have time to scan the huge pools of posted résumés on the various job sites. Instead, they pore over the e-mail responses to their specific job listings. Those recruiters who did scan posted résumés said it was more efficient to rely on an automated keyword search to ferret out favorable candidates.

Keyword searches tend to focus on skills and experiences that can be easily defined in a single word. So technical terms like *Pascal* or *AS400* make someone with a particular skill or experience easier to spot. But more abstract abilities like management skill and negotiation experience aren't so easily captured with a keyword.

While I had lots of technical consulting experience, knew the PC industry thoroughly, and could throw around a few techie acronyms of my own, I wanted a job that focused on the more abstract. Alas, I just wasn't "keyword desirable."

Of the 15 specific job listings I replied to, I received no responses at first. But after a few days, the messages did start coming in. Some were outright rejections, and some were the annoyingly ambiguous "we're currently evaluating our needs" song and dance. Some came via e-mail and some, surprisingly, were delivered by regular mail. A valuable lesson: Don't assume that because you sent a résumé by e-mail that the company will (or even can) respond in kind. And *always* put a full mailing address on your electronic résumé. I suspect that this omission cost me a few responses.

At the same time, I also applied to similar positions through newspaper ads. To my surprise, responses from these employers (though they were all rejections) outnumbered replies from online recruiters.

Why so few responses? Maybe it was the keyword problem again. But more likely it was because I was making a lateral move into a new type of job. Though I had no direct experience, I had the skills, and *I* knew I could translate them to the task.

After a month I got a call about a consulting/marketing position that matched my skills perfectly. It was a tempting offer, but a little voice in my head said that I should shop around a little more. The recruiter had found my name by searching CareerMosaic's open bank of résumés, simply by using the site's search tools. So posting an online résumé brought me my only job search success.

IS THE WEB THE WAY?

DESPITE MY DEARTH of responses, I still believe that the Internet is an indispensable tool for finding a job. In fact, if your skills are in high demand and you just want to get your résumé in front of the right person, a few minutes online may be all you need.

But you would be the exception. The rest of us shouldn't give up the traditional job hunt. If your strengths don't translate to popular keywords, you'll need to hunt down opportunities yourself and develop the contacts to exploit them—and you've got the Internet right there to get you started. But using the Net alone is probably not enough to nail you a job. At least, not yet.

Kirk Steers is a contributing editor for PC World. ▶

Top Tips for Employers

USE THE HOME FIELD ADVANTAGE. Your company's Web site can be a powerful recruitment tool. Use it to define the kind of people you want and what you have to offer.

FLAUNT YOUR WEB SITE. Include an e-mail address and your Web site's URL in all printed ads, and make sure that your online listings always contain direct links back to your company's site.

BE SELECTIVE. Start by being particularly choosy about where you post your openings, then expand your search until you find what works best for you.

SHOP AROUND. If you're on a tight budget, look to low-cost options like Yahoo and Usenet for free job postings.

PLAN AHEAD. Many e-mail programs can be set so they will automatically send acknowledgments to candidates upon receipt of their résumés and cover letters.

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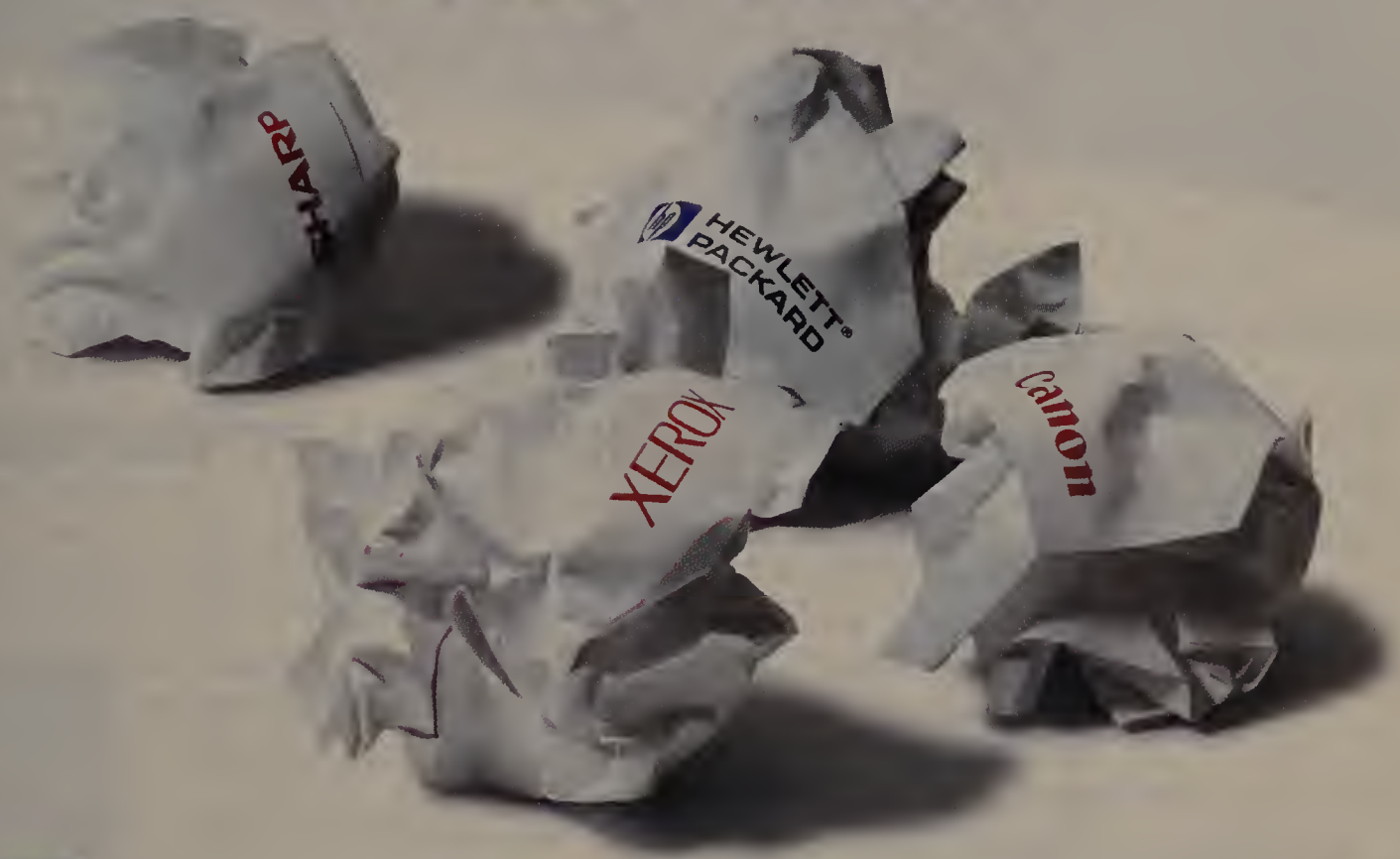

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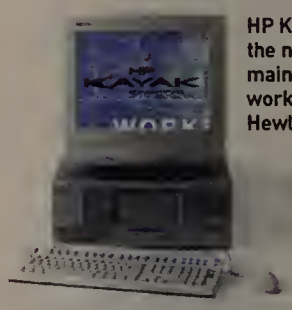

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Shopping for a Job on the Net

CAREER COUNSELING

- **Bureau of Labor Statistics: Surveys & Programs (stats.bls.gov/proghome.htm)** Salaries by industry or region; health and safety reports; benefit plans.
- **CareerCity (www.careercity.com)** The whole process, from cover letters to interviews.
- **Career Magazine (www.careermag.com)** All aspects of working and job hunting, plus a job bank and résumé tips.
- **Keirsey Temperament Sorter (www.keirsey.com)** Self analysis gives insight into your personality and work habits.
- **Occupational Outlook Handbook (stats.bls.gov/ocohome.htm)** Descriptions, salaries, and expected growth for many professions.
- **The Platinum Rule: Personality Style Quiz (www.platinumrule.com)** Quiz offers advice on interacting with others at work and at home.
- **The Princeton Review: Career (www.review.com/career)** Profiles of various careers, networking tips, and more.
- **The Riley Guide (www.dbm.com/jobguide)** Find a career counselor, get résumé advice, streamline your search.
- **University of California, Berkeley: Career Exploration Links (www.uhs.berkeley.edu/CareerLibrary/links/career.cfm)** Utilitarian directory of career-related sites, sorted by occupation.

COMPANY RESEARCH

- **American City Business Journals (www.amcity.com)** Regional business news; profiles and job openings for select companies.
- **Hoovers Online (www.hoovers.com)** Contact info, competitors, and more for thousands of companies.
- **InfoSpace: Companies Online (www.infospace.com/bizweb.htm)** Maps, directions, and guides to cities where specific companies are located.
- **JobSafari (www.jobsafari.com)** Links to thousands of company human resources pages.
- **Women's Wire: Best Companies for Women (www.womenswire.com/work/work.html)** Companies are rated in terms of benefits, child care, family leave policies, and salaries.

JOB SITES

- **America's Employers (www.americasemployers.com)** Advice, live chats with recruiters, job listings, free résumé database.
- **Career.com (www.career.com)** Job database and résumé bank. Free to job seekers; employers pay a fee.
- **Career Exposure (www.careerxposure.com)** Résumé bank; career tips; postings searchable by keyword, location, or industry; woman-owned.
- **Careerfile (www.careerfile.com)** E-mail notification of executive, managerial, and technical openings.
- **Career Shop (www.careershop.com)** Search jobs by keyword or browse by company; both job seekers and employers search for free.

- **4Work.com (www.4work.com)** Intern and volunteer openings, as well as paying jobs.
- **CareerWeb (www.cweb.com)** Postings for professional, managerial, and technical jobs; advice.
- **Contractors Direct (www.cdirect.com.au)** Skills database for freelancers and consultants.
- **HeadHunter.Net (www.headhunter.net)** Quick searches of job listings; good résumé bank.
- **JobTrak (www.jobtrak.com)** Helps recent college grads set up informational interviews.
- **Overseas Jobs Express (www.overseasjobs.com)** International job listings, helpful advice on working abroad, and a large résumé bank.
- **Top Jobs on the Net (www.topjobs.co.uk)** Well-rounded resource for those seeking employment in Europe.

USENET NEWSGROUPS

- **us.jobs.contract, us.jobs.offered, us.jobs.offered.contract, us.jobs.misc** Most listings are for high-tech jobs such as programming, technical writing, and engineering.

RÉSUMÉ HELPERS

- **CareerLab: 200 Free Cover Letters for Job Hunters (www.careerlab.com/letters)** Collection of sample letters.
- **How to Create an Online Résumé (titaniwu.edu/~ccenter/resume)** Concise advice on designing ASCII and HTML résumés.
- **ProvenResumes.com (www.provenresumes.com)** Free résumé workshops.
- **Resumix: Creating Your Résumé (www.resumix.com/resume/resumeindex.html)** Create basic, attractive online résumés.
- **WorkSearch (www.golden.net/~archeus/worksrch.htm)** How to compose cover letters and evaluate résumé-writing services.

MAKING CONTACTS

- **Career Expo (www.eos.net/careerex/upcoming.html)** National list of upcoming job fairs, broken down geographically.
- **TalkCity: Business and Professional (www.talkcity.com/channels/business_and_professional.htmpl)** Chats and forums on such topics as management, home offices, and women in business.
- **Westech's Virtual Job Fair (www.vjf.com)** High-tech jobs, résumé bank, and a schedule of trade shows.
- **Yahoo's List of Labor Unions (www.yahoo.com/business_and_economy/labor/unions)** and **List of Trade Associations (www.yahoo.com/business_and_economy/organizations/trade_associations)** Huge lists can help you find your local chapter or connect to hundreds of international, national, and regional sites.

YOU CAN BEGIN YOUR JOB SEARCH with links to all the sites listed above. Just point your browser to PC World Online at **www.pcworld.com/july98/jobhunt** ■

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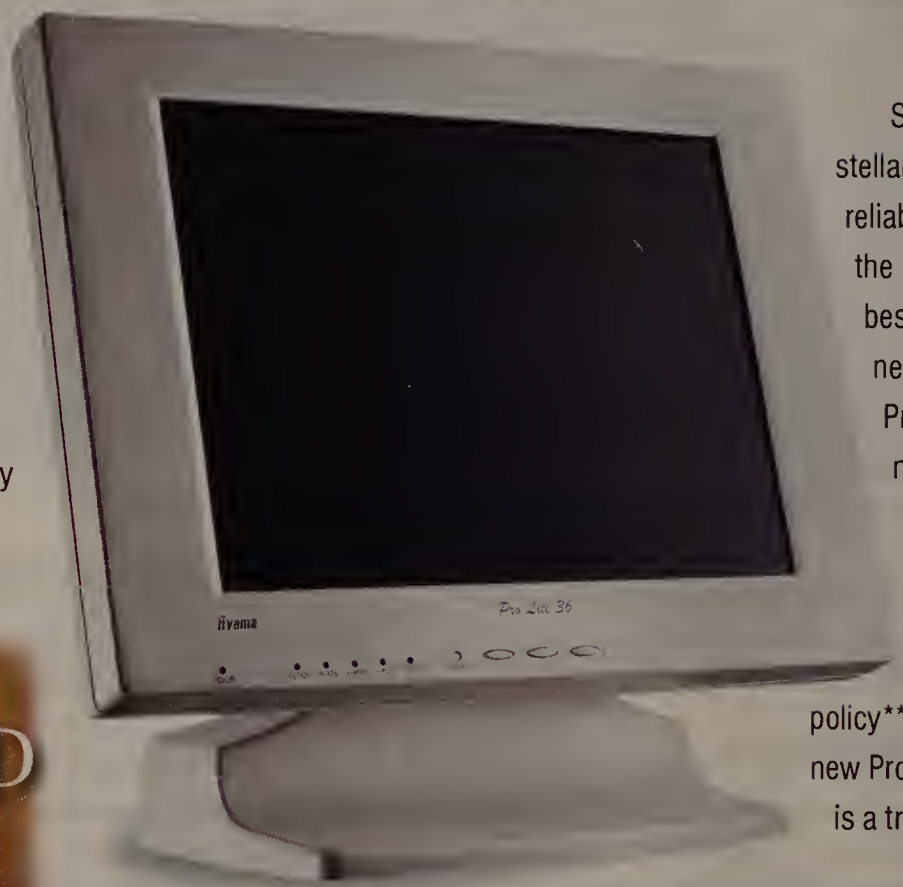

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PC Magazine Best of 1997 — January 6, 1998, Vision Master Pro t7

Cadalyst Labs Highly Recommended 1998 — *Perfect Five-Star Rating*, January 1998, Vision Master 450, Vision Master Pro 500

ComputerLife — *Perfect Five-Star Rating*, November 1997, Vision Master Pro t7

Test Center 1997 Resellers News — *Performance & Technical Excellence*, March 1997, Vision Master Pro 21

MW Editors' Choice — *Six Time Winner*, Jan 1997, Feb 1997, March 1997, April 1997, May 1997, June t997, Vision Master Pro 21

PC Magazine Editors' Choice 1998 — October 7, 1997, Vision Master Pro t7

Cadalyst Labs 4½ Star Rating 1998 — March t997, Vision Master Pro 21

PC World Best Buy — *Six Time Winner*, July 1996, Jan 1997, March 1997, July t997, Sept 1997, Jan 1998, Vision Master Pro t7

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TOP 100

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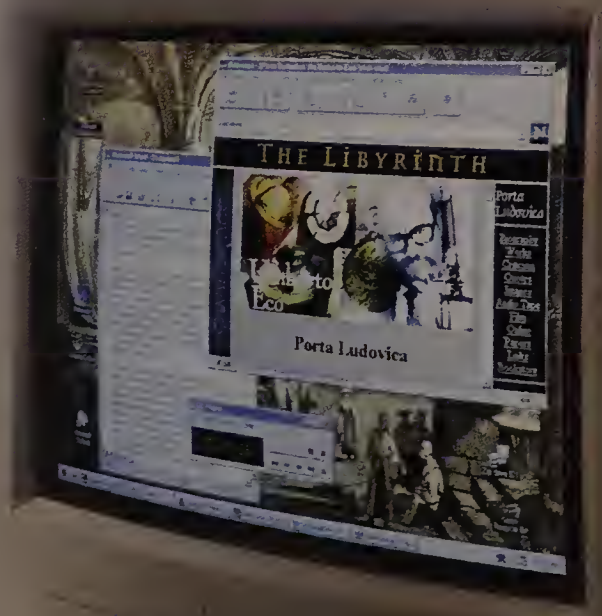
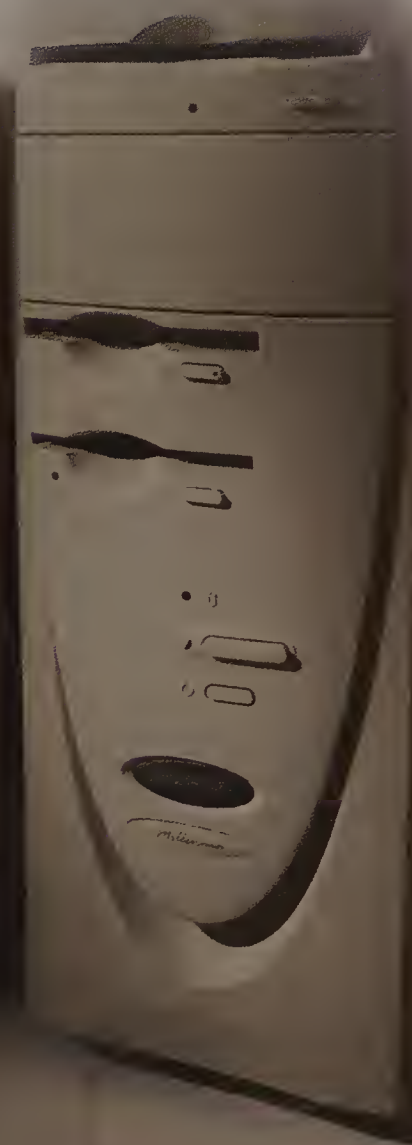
350- AND 400-MHz Pentium IIs:

THE New Speed Kings

BY MICHAEL DESMOND AND GRACE AQUINO





PEERLESS: The Micron Millennia 400 DVD Edition racked up a best-ever PC WorldBench score of 210.

WE'VE SEEN A LOT OF CPU introductions here on the Top 100 staff. So when yet another "fastest ever" CPU makes its debut, we're not prone to breathless endorsements. If anything, we've become downright cynical. Our tests typically show that faster CPUs fail to deliver a proportionate increase in performance—a real disappointment given the stiff premium these systems usually carry.

This time, it's different. Following up our cover story in June about the first PCs based on Intel's new 350- and 400-MHz chips (see "400-MHz Pentium IIs: The Great Leap Forward"), this month we reviewed eight of these machines for the Top 20. The huge gains these new PCs—particularly the PII-400 models—offer over the previous standard bearer, the Pentium II-333s, are so striking they almost sweep our Top 20 Power Desktops chart by claiming four of the five Best Buys, a first-time event. Our new number one power machine is Gateway's GP6-400, a $2913 network card–equipped PII-400.

The Pentium II-400 PCs offer such huge gains over PII-333s that they almost sweep our power Best Buys.

DESKTOP OR TOWER: The 6400CDS can be either.

POWER FOR SALE, CHEAP

ECHOING OUR JUNE results, the three PII-350 desktops we reviewed for the Top 20s turned in PC WorldBench 98 scores that are, on average, a full 10 percent faster than those of their 333-MHz predecessors. The five PII-400 PCs pushed that advantage further still, running 20 percent faster than a typical PII-333 desktop. The fastest of them all: Micron's Millennia 400 DVD Edition, which leads all Windows 95 systems with a PC WorldBench score of 210.

More important than big benchmark numbers, some of these systems are relatively cheap, compared to what new PCs went for a year ago. The average price for a new PII-350 is $2665, while PII-400s cost an average of $3038. The best deal in a PII-400 is Hewlett-Packard's Vectra VL Series 8, number nine on the power chart. It costs just $2750 despite having a built-in ethernet card. The cheapest of the group is the ProGen Polaris PII-350, whose rock-bottom $2149 price lands it at number 15 on the Budget Desktops chart. The Polaris also sets a new Windows 95–based performance mark for budget desktops. Our only caveat with this low-cost system: ProGen has had some trouble in the past responding to service problems (see *PCW Advocate* in April).

Our top-rated PII-400s may not be cheap, but they come fully stocked with cutting-edge components and software. The $3298 Micron Millennia 400 DVD Edition and $3149 Dell Dimension XPS R400—both Best Buys—come equipped with DVD-ROM drives and internal Zip drives. Both the R400 and its sibling, the Dimension XPS R350, include jumbo 14GB hard disks. Our top power desktop, Gateway's $2913 GP6-400, strikes a balance by forgoing an expensive DVD-ROM drive in favor of a 13X–32X CD-ROM drive.

For the suit-and-tie set, a pair of PII-400s from Hewlett-Packard and Compaq deliver the goods. Both include ethernet cards, client management software, and easy-access cases ready-made for effective maintenance. We were especially impressed with the unique convertible case design of the Compaq Deskpro EP Model 6400/6400CDS, which allows you to mount externally accessible drives either horizontally or vertically, depending on how you want to orient the case.

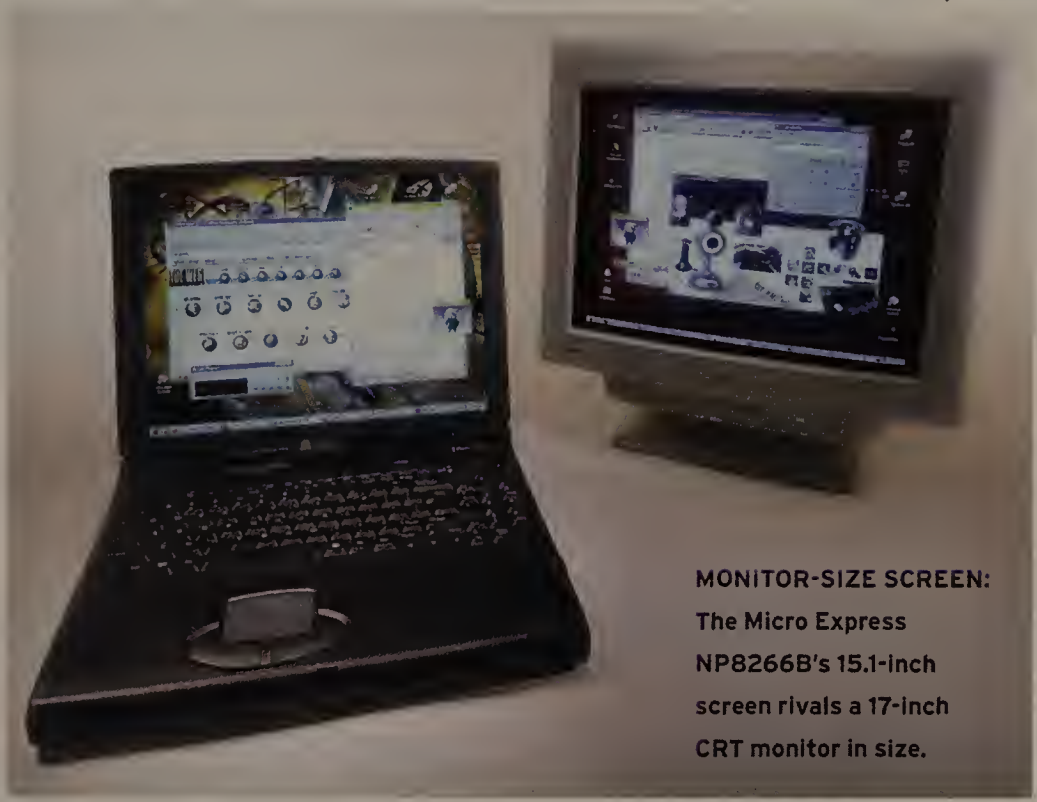
If you want cutting-edge multimedia, you can save $200 to $300 by going with a PII-350 model. The Micron Millennia 350 Personal Edition costs $2848 and comes configured with a 17-inch monitor, huge 10GB hard disk, and complete multimedia setup including a 12X–32X CD-ROM drive and multimedia speakers with subwoofer.

TRICKLE-DOWN ECONOMICS

BEHIND THE HEADY benchmark numbers is a new generation of motherboards that run at 100 MHz rather than 66 MHz. These fast boards boost the clock speed of system memory and the CPU-to-system bus by 50 percent—the first speed hike since the introduction of Pentium PCs back in 1993. The faster bus allows the CPU to run closer to its potential.

Our tests don't show it, but the new motherboard speed has big implications for heavy-duty multimedia, graphics, and 3D games. The data used in these operations often doesn't fit in a processor's 512KB secondary cache, making system memory speed a critical bottleneck. With RAM running 50 percent faster than before, the CPU is better able to keep up with such cache-confounding tasks as the software-based playback of MPEG-2 video.

If you don't need a superfast computer, there is good news. The onslaught of new PCs has put the squeeze on system prices across the board. A mere $2000 now buys a fast and loaded Pentium II-300 or PII-333 system with 64MB of RAM, a 17-inch monitor, and a 6.4GB hard drive. The price cutting could spell curtains for the Pentium MMX processor, which has long been a fixture among bargain systems. Dell, for instance, has already announced that it will no longer sell Dimension models that are based on the Pentium MMX CPU, and other vendors are likely to follow suit before long.



MONITOR-SIZE SCREEN: The Micro Express NP8266B's 15.1-inch screen rivals a 17-inch CRT monitor in size.

AMD JUMPS IN

THE 100-MHZ REVOLUTION isn't over yet. By the time you read this, Advanced Micro Devices should have released its K6-2 CPU, which features a fast built-in secondary cache and can run on 100-MHz motherboards. The faster motherboard speed should put this Pentium II competitor back in the performance pack and ensure that buyers continue to enjoy a low-cost alternative to Intel's CPUs. The new AMD chip will also introduce 3DNow, extensions to the processor instruction set that will boost execution of 3D graphics operations. Like the MMX extensions before it, 3DNow will be supported by Microsoft's DirectX multimedia architecture, though it remains to be seen whether game developers will follow suit.

GIANT NOTEBOOK SCREENS

THIS MONTH WE ALSO SAW our first notebook computers outfitted with extra-large 15.1-inch active-matrix displays.

The jumbo screens on Micro Express's NP8266B and the Eurocom 8500M—nearly as big as the viewable area of a 17-inch CRT monitor—might make you feel as if you never left your office. At almost 11 pounds, however, these notebooks aren't designed for frequent travel. They also didn't make our Top 10 Notebooks chart. But Dell's $3799 PII–based Dell Latitude CPi D266XT did. With its solid construction and sleek design, this fast portable is just the third PII model to crack our power chart.

Michael Desmond is a senior associate editor and Grace Aquino a staff editor for PC World. Senior Editor Rex Farrance of PC World Online, Assistant Editor Mick Lockey, Associate Editor Vince Bielski, Senior Associate Editor Bryan Hastings, and freelance writers Nancy Canning and Jon L. Jacobi contributed to the Top 100. Testing for the Top 100 was performed by Ulrike Diehlmann, Robert James, Elliott Kirschling, Jeffrey Kuta, Nancy Miller, and Mike Salayko of the PC World Test Center. See page 14 for contact information. ▶

YOUR GUIDE TO THE TOP 100

QUESTIONS ABOUT OUR CHARTS? The following section should answer most of them.

How do the charts work? The Top 20 and Top 10 charts are evolving lists of the best PCs, monitors, modems, printers, and graphics boards we've tested. System charts are divided by price. Power desktops cost $2250 or more; power notebooks cost $2750 or more. We compare new products to previously reviewed hardware, updating the charts to reflect price cuts and other changes.

Where do you get your prices? We estimate street prices based on vendor information and our own research, including surveys of retail outlets. We recheck all prices every month.

What does the overall rating mean? This 100-point scale reflects results from our hands-on evaluations and performance tests. A score in the 90s is exceptional, while one in the 80s is among the best and one in the 70s above average.

What does the PC WorldBench score mean? It's a measure of how fast a PC is in relation to our baseline machine, a Gateway PMMX-200 configured with 32MB of RAM, a 2GB hard drive, and 512KB of secondary cache. A PC that scores 200, for instance, is twice as fast as the baseline system.

Where do the scores for reliability, support quality, and support policies come from? Reliability and support quality scores are based on surveys of *PC World* readers and anonymous support calls made by *PC World* staff. The policies score is based on vendor support policies.

What do all those word scores mean? Word scores for performance and price are based on a product's rating in relation to other products in its category. For instance, we score the performance of Windows NT PCs separately from that of Windows 95 machines. (Based on our PC WorldBench 98 tests, Windows NT machines are faster on average than Win 95 PCs.)

Check out *PC World's* Top 400 reviews online. Go to PC World Online (www.pcworld.com/hardware/top400) to explore our Top 400, which provides comprehensive reviews and ratings for products in 16 categories. You'll also find reviews not available in print.

PC WORLD

TOP 20 POWER DESKTOPS

	SYSTEM	Last month	Month tested	Street price (4/10/98)	CPU	Comments
1	Gateway GP6-400 800/846-2000 www.gateway.com	n/a	NEW	$2913	Pentium II-400	Top PII-400 is stylish and network-equipped, includes Zip drive.
2	Micron Millennia 400 DVD Edition 888/634-8799 www.micronpc.com	n/a	NEW	$3298	Pentium II-400	Power and style in the fastest-yet Pentium II-400, includes DVD-ROM drive.
3	Micron Millennia 350 Personal Edition 888/634-8799 www.micronpc.com	n/a	NEW	$2848	Pentium II-350	Fast and loaded PII-350 multimedia PC challenges PII-400s.
4	Dell Dimension XPS R400 800/388-8542 www.dell.com	n/a	NEW	$3149	Pentium II-400	The ultimate SOHO PC? Pricey PII-400 has DVD-ROM, MS Office, 14GB hard disk.
5	Dell OptiPlex GXa 333 800/388-8542 www.dell.com	n/a	NEW	$2718	Pentium II-333	A PC with network appeal: great interior, fast, and affordable.
6	Gateway G6-333 800/846-2000 www.gateway.com	1	June 98	$2530	Pentium II-333	Speedy, has 2X DVD-ROM drive and lots of software.
7	Dell Dimension XPS R350 800/388-8542 www.dell.com	n/a	NEW	$2999	Pentium II-350	R400's twin is slower and cheaper, but configured the same.
8	Compaq Deskpro EP Model 6400/6400CDS 800/345-1518 www.compaq.com	n/a	NEW	$3079	Pentium II-400	Slick convertible case, network features add appeal to corporate speedster.
9	HP Vectra VL Series 8 800/322-4772 www.hp.com	n/a	NEW	$2750	Pentium II-400	Easy-access design and superlative performance in affordable PII-400.
10	Gateway E-3110 333 800/846-2000 www.gateway.com	n/a	NEW	$2747	Pentium II-333	Affordable and nicely crafted network-ready PC is slow for a PII-333.
11	Quantex QP6/300 SM-4x 800/896-4898 www.quantex.com	4	May 98	$2449	Pentium II-300	Well-stocked PII-300 falls behind PII-350 and 400 competition, has big monitor.
12	NEC PowerMate Enterprise 8000 888/863-2669 www.necnow.com	7	May 98	$2448	Pentium II-333	Big $450 price drop on quick PII-333; includes LAN card but no modem.
13	HP Vectra VL Series 7 800/752-0900 www.hp.com	10	May 98	$3030	Pentium II-333	With Windows NT, this corporate PC is among the fastest we've ever tested.
14	Quantex QP6/300 SM-4xSE 800/896-4898 www.quantex.com	9	May 98	$2349	Pentium II-300	$200 off inexpensive, fairly slow PC with 2X DVD-ROM drive.
15	Kingdom Pinnacle PII-333 800/385-3436 www.kingdomcomputers.com	n/a	NEW	$2397	Pentium II-333	Fastest Win 95 PII-333 includes DVD-ROM drive, poor keyboard.
16	Sys Technology Performance Pro 300LA 800/613-9963 www.systechnology.com	12	May 98	$2610	Pentium II-300	Fast NT-based PII-300 with top components; good support policies.
17	EPS Evolution XP PII-333 800/447-0921 www.epstech.com	n/a	NEW	$2445	Pentium II-333	Zippy home and office PC includes Office 97, joystick, game titles.
18	Sys Technology Performance Pro 333H2 800/613-9963 www.systechnology.com	13	June 98	$3257	Pentium II-333	Well-configured and very fast PII-333 comes with Windows NT 4.0
19	Everex StepStation 2 P2-300 800/383-7391 www.everex.com	18	May 98	$2550	Pentium II-300	Plain-Jane Pentium II-300 comes with NT, crisp monitor, ethernet adapter.
20	Vektron Super Power Station PII-300 800/725-0026 www.vektron.com	n/a	May 98	$2399	Pentium II-300	Very fast and loaded PII-300 with 19-inch monitor.

Best Buy See features chart, page 218; test report, page 220.

n/a = not applicable

[1] A system's performance word score is relative to scores of other PCs running the same operating system. For more details, see "Your Guide to the Top 100."
[2] For more information about all products in this table, circle reader service no. 908.

WHAT A MONTH. Eleven new desktops landed on our power chart, including all five Best Buys—a rare sweep. Three of the top four systems feature the Pentium II-400 CPU. But corporate users might want to consider the number five Dell OptiPlex GXa 333, a fine, network-savvy midtower that runs Windows NT 4.0 and has an interior optimized for quick upgrades. Want more power in a business box? Check out the PII-400–based Compaq Deskpro EP Model 6400/6400CDS and HP Vectra VL Series 8. These eighth- and ninth-ranked systems include network cards and easy-access designs. Of the 11 new desktops, 8 come with internal Zip drives, 4 with 100-mbps ethernet cards and client management software.

SCORECARD

★ Overall rating	PC WorldBench 98/operating system	Performance [1]	Features and design	Vendor's system reliability	Price	Vendor's support quality/policies	Reader service number [2]
87	204/Win 95	very good	outstanding	average	average	above average/best	805
86	210/Win 95	outstanding	very good	above average	very expensive	above average/best	806
85	194/Win 95	very good	very good	above average	average	above average/best	807
85	199/Win 95	very good	very good	above average	expensive	above average/best	808
85	213/NT 4.0	very good	very good	above average	average	above average/best	809
84	179/Win 95	good	very good	average	inexpensive	above average/best	810
84	187/Win 95	good	very good	above average	expensive	above average/best	811
83	200/Win 95	very good	very good	average	expensive	average/best	812
82	207/Win 95	outstanding	very good	average	average	average/poor	813
82	163/Win 95	good	outstanding	average	average	above average/best	814
80	151/Win 95	satisfactory	outstanding	average	inexpensive	average/best	815
78	175/Win 95	good	very good	below average	inexpensive	average/good	816
78	218/NT 4.0	very good	very good	average	expensive	average/poor	817
78	136/Win 95	poor	outstanding	average	inexpensive	average/best	818
78	181/Win 95	good	very good	[3]	inexpensive	[3]/fair	819
78	213/NT 4.0	very good	very good	[3]	average	[3]/good	820
76	177/Win 95	good	very good	[3]	inexpensive	[3]/fair	821
76	220/NT 4.0	outstanding	very good	[3]	very expensive	[3]/good	822
75	205/NT 4.0	good	good	[3]	inexpensive	[3]/best	823
75	163/Win 95	good	good	[3]	inexpensive	[3]/best	824
Scorecard weightings ▶		Performance 25 percent	Features 25 percent	Reliability 15 percent	Price 15 percent	Quality/policies 10 percent each	

[3] Insufficient data to give a rating.

This Month's Best Buys

1 GATEWAY GP6-400

PRO: Excellent performance, affordable for a PII-400, great sound system, ethernet

CON: Small power supply; poor airflow, labeling

Want Formula 1 performance at Honda prices? The Gateway GP6-400 comes close, leading five new superfast Pentium II-400 PCs. The mid-size tower features a network card and outstanding speed, yet at $2913 is one of just two PII-400 PCs (along with HP's Vectra VL Series 8) to sell for under $3000.

With a PC WorldBench 98 score of 204, the GP6-400 gives Windows 95 performance that is typical for its class—and just a hair slower than the fastest Win 95 PC we've ever tested, the Micron Millennia 400 DVD Edition, which scored 210. With a 100-megabits-per-second SMC Etherpower II 10/100 ethernet adapter and Intel's LANDesk Client Manager, the GP6-400 is ready to connect your home or small office to a network. A big 10GB hard disk, 13X–32X CD-ROM drive, and built-in Iomega Zip drive provide ample storage.

Gateway GP6-400

The PC doubles as a first-class entertainment system. Audio is outstanding—the Boston Acoustic Micro Media System consists of a subwoofer and two palm-size satellite speakers—and the STB Velocity 128 Accelerated Graphics Port card teams with a sharp 17-inch monitor to deliver knockout graphics and accelerated 3D.

The GP6-400's case is easy to open, but we would prefer that channeled airflow cool the fast CPU. If you intend to add more drives, you may want to upgrade the 200-watt power supply.

Gateway's documentation is comprehensive and first rate. Support policies include a three-year parts and labor warranty and toll-free tech support 24 hours a day. The company has long received high marks from our readers for its service.

2 MICRON MILLENNIA 400 DVD EDITION

PRO: Fastest PII-400 we've tested, DVD-ROM drive, superior reliability and service

CON: Pricey; uninspiring audio and monitor

The Micron Millennia 400 DVD Edition may have set the performance standard among Pentium II-400 PCs. With a PC WorldBench score of 210, it's the fastest Windows 95–based system we've ever tested. At $3298, it's not cheap, but it comes loaded with features, and the company has an enviable record of service and reliability.

Millennia 400 DVD Edition

This Millennia unit even looks fast, with its chiseled curves and molded slots for the floppy, Iomega Zip, and DVD-ROM drives. The back of the system features color- ▶

PHOTOGRAPHS BY KEN SMITH

TOP 20 POWER DESKTOPS — STANDARD FEATURES

	SYSTEM	CPU	Operating system	RAM (MB)	Secondary cache (KB)	Hard drive (GB)	Graphics adapter	Video RAM (MB/type)	Monitor tube/viewable diagonal (inches)	Modem speed (kbps)
1	Gateway GP6-400*	Pentium II-400	Windows 95	64	512	10	STB Velocity 128 (AGP)	4/SGRAM	17/15.9	not included
2	Micron Millennia 400 DVD Edition*	Pentium II-400	Windows 95	64	512	10	Diamond Viper 330 (AGP)	4/SGRAM	17/16	56 [2]
3	Micron Millennia 350 Personal Edition*	Pentium II-350	Windows 95	64	512	10	Diamond Viper 330 (AGP)	4/SGRAM	17/16	56 [2]
4	Dell Dimension XPS R400*	Pentium II-400	Windows 95	64	512	14	STB Nvidia Plus	4/SGRAM	17/15.8	56 [2]
5	Dell OptiPlex GXa 333*	Pentium II-333	Windows NT 4.0	64	512	6.5	ATI Xpert@Work (AGP)	4/SGRAM	17/16	not included
6	Gateway G6-333	Pentium II-333	Windows 95	64	512	8.4	STB Velocity 128 (AGP)	4/SGRAM	17/16.1	56 [2]
7	Dell Dimension XPS R350	Pentium II-350	Windows 95	64	512	14	STB Nvidia Plus	4/SGRAM	17/15.8	56 [2]
8	Compaq Deskpro EP Model 6400/6400CDS	Pentium II-400	Windows 95	64	512	6.4	Diamond Viper 330 (AGP)	4/SGRAM	17/16	56 [2]
9	HP Vectra VL Series 8	Pentium II-400	Windows 95	64	512	10	Matrox MGA G-100 (AGP)	4/SGRAM	17/15.9	not included
10	Gateway E-3110 333	Pentium II-333	Windows 95	64	512	8.4	ATI Xpert@Work (AGP)	8/SGRAM	19/17.9	56 [2]
11	Quantex QP6/300 SM-4x	Pentium II-300	Windows 95	64	512	6.4	Number Nine Revolution 3D	8/WRAM	19/17.9	56 [3]
12	NEC PowerMate Enterprise 8000	Pentium II-333	Windows 95	64	512	6.4	ATI 3D Rage Pro	8/SGRAM	17/16	not included
13	HP Vectra VL Series 7	Pentium II-333	Windows NT 4.0	64	512	6.4	Matrox Millennium II	8/WRAM	17/15.9	not included
14	Quantex QP6/300 SM-4xSE	Pentium II-300	Windows 95	32	512	6.4	Diamond Viper V330 (AGP)	4/SGRAM	19/17.9	56 [3]
15	Kingdom Pinnacle PII-333	Pentium II-333	Windows 95	64	512	8.4	ATI Xpert@Work (AGP)	4/SGRAM	17/15.7	56 [2]
16	Sys Technology Sys Performance Pro 300LA	Pentium II-300	Windows NT 4.0	64	512	6.4	Matrox Millennium II (AGP)	8/WRAM	17/15.7	56 [2]
17	EPS Evolution XP PII-333	Pentium II-333	Windows 95	64	512	8.4	ATI Xpert@Work (AGP)	4/SGRAM	17/16	56 [3]
18	Sys Technology Performance Pro 333H2	Pentium II-333	Windows NT 4.0	64	512	8.4	Matrox Millennium II (AGP)	8/WRAM	17/15.9	56 [2]
19	Everex StepStation 2 P2-300	Pentium II-300	Windows NT 4.0	64	512	8.4	FIC Permedia 2	8/SGRAM	17/16.1	not included
20	Vektron Super Power Station PII-300	Pentium II-300	Windows 95	64	512	7	Matrox Millennium II (AGP)	4/WRAM	19/18	56 [2]

* Best Buy

[1] *PC World* defines towers as taller than 20 inches, midtowers as 15.5 inches to 20 inches, and minitowers as shorter than 15.5 inches.
[2] Downloads only, uploads at 33.6 kbps; uses 3Com/U.S. Robotics' x2 technology.

coded ports; the case opens easily to reveal a tidy interior with plenty of open drive bays, card slots, and DIMM sockets.

Multimedia fans will welcome the second-generation DVD-ROM drive and media card. Storage hardware includes an internal Zip drive, a floppy drive, and a 10GB hard disk that uses an Ultra DMA interface—also known as ATA-33—to deliver fast 33-mbps transfer rates.

The Diamond Viper 330 AGP card delivers snappy graphics for business and 3D game software alike, but the 17-inch monitor was mediocre in our tests. The display appeared washed out and suffered from fuzzy images at the edges. And the Altec Lansing AV390 speakers and subwoofer produced little bass until we cranked the volume past the halfway point. Micron does provide audio editing software, as well as Microsoft Office 97 Small Business Edition and a 56-kilobits-per-second x2-compatible modem from 3Com.

Beyond the manuals for individual components, documentation is sparse. But support policies are first rate, with a three-year parts and one-year labor warranty and round-the-clock technical phone support.

3 MICRON MILLENNIA 350 PERSONAL EDITION

PRO: Great speed, loaded, good support

CON: Expensive; so-so monitor

The Micron Millennia 350 Personal Edition has a lot in common with its sibling, the Millennia 400 DVD Edition (see above): same sculpted chassis, a similarly loaded configuration, and a rather steep price. But even at $2848, it's about $150 less than the number seven Dell Dimension XPS R350, the other PII-350 system on the power chart. Like the 400, it's the fastest PC of its kind.

Millennia 350 Personal

With a PC WorldBench score of 194, this Millennia is nearly as fast as the slowest PII-400, but lags behind its sibling by about 8 percent. A 10GB hard disk and an Iomega Zip drive provide ample storage, and we like the slot-loading mechanism on the 12X–32X CD-ROM drive.

The Personal in this system's name means that it's intended mainly for life in the den. Whereas the 400 DVD Edition

		EXPANDABILITY				CUSTOMER SUPPORT			
CD/DVD-ROM drive speed	Sound board	Case style [1]	Max. RAM (MB)	Open RAM sockets	Open drive bays (ext./int.)	Open slots	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
13X-32X	integrated Ensoniq Audio PCI	midtower	384	2	2/2	4	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
2X DVD-ROM	integrated Crystal PnP	midtower	384	2	2/1	4	3/1	24	Sat., Sun.	BBS, CIS, WWW
12X-32X	integrated Crystal PnP	midtower	384	2	2/1	4	3/1	24	Sat., Sun.	BBS, CIS, WWW
2X DVD-ROM	TBS Montego 430	midtower	384	2	2/1	2	3/1	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
12X-24X	integrated Crystal 4623B	midtower	384	2	2/1	6	3/1	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
2X DVD	Ensoniq Audio PCI	midtower	384	1	3/2	2	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
2X DVD-ROM	TBS Montego 430	midtower	384	2	2/1	2	3/1	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
12X-24X	ESS ES1869	desktop	384	2	1/1	4	3/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
12X-32X	HP Audio (AZT 1008)	midtower	768	1	2/1	4	3/3	11 [4]	none	AOL, BBS, CIS, WWW
13X-32X	Ensoniq Audio PCI	midtower	384	2	2/2	2	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
14X-32X	Ensoniq Audio PCI	midtower	512	2	3/3	4	3/1	24	Sat., Sun.	BBS, WWW
12X-24X	integrated Yamaha OPL3-Sax	midtower	384	2	2/1	5	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
12X-24X	Aztech AZT2320	midtower	384	2	2/1	4	3/3	11 [4]	none	AOL, BBS, CIS, WWW
2X DVD-ROM	Ensoniq Audio PCI	midtower	512	3	3/3	4	3/1	24	Sat., Sun.	BBS, WWW
2X DVD-ROM	Sound Blaster AWE64	midtower	512	2	3/2	3	varies [5]/1	15.5	Sat.	WWW
12X-24X	Sound Blaster AWE64	midtower	1024	2	3/2	4	varies [6]/5	24	Sat., Sun.	WWW
12X-32X	Ensoniq Audio PCI	midtower	384	2	2/2	3	3/3	14	Sat.	BBS, WWW
14X-32X	integrated Yamaha OPL3-Sax	midtower	384	1	3/1	3	varies [6]/5	24	Sat., Sun.	WWW
14X-32X	ESS Sound Conductor 16 PnP	midtower	384	2	3/1	4	3/3	24	Sat., Sun.	BBS, WWW
14X-32X	integrated SSO 3D	midtower	768	2	3/0	4	3/1	24	Sat., Sun.	WWW

[3] Downloads only, uploads at 33.6 kbps; uses Rockwell-Lucent's K56flex technology.
[4] Not toll-free.
[5] Five years on CPU and RAM, three years on other parts.
[6] Six years on CPU and main RAM, one to five years on other parts.

comes with Microsoft Office SBE, this PC dishes out the Audio Works Pro Studio sound editing package. The 17-inch Micron monitor provides ample viewable area, but the image looked a bit fuzzy and slightly bowed in our tests. The Altec Lansing speaker system isn't bad once you crank it up, but the subwoofer produces muddy response at lower volume.

The off-white midtower case is sturdy, stable, and easy to open. Inside, a whisper-quiet fan blows air directly over the enormous heat sink on the processor. The keyboard, while slightly spongy, is comfortable. Micron offers a standard three-year parts, one-year labor warranty. Its system documentation is thorough. We have consistently rated its round-the-clock toll-free tech support outstanding.

4 DELL DIMENSION XPS R400

PRO: 14GB hard disk, Trinitron monitor, DVD-ROM and Zip drives

CON: Slowest PII-400, hard-to-remove case

The Dimension XPS R400 is a no-compromise dream machine, appropriate for both home and office. Somewhat pricey at $3149, and encumbered with the lowest PC WorldBench score among Pentium II-400s we tested, this Dimension still earns a Best Buy for its loaded configuration.

Storage is a forte of the XPS R400. A cavernous IBM Deskstar Ultra ATA hard disk holds 14GB of data. A second-generation DVD-ROM drive ensures compatibility with the latest games and MPEG-2 video titles, while an internal Iomega Zip drive gives you quick backups.

Dell Dimension XPS R400

The R400 also includes the 4MB STB Nvidia Plus graphics card—a regular on our *Top 10 Graphics Boards* charts. The eye-catching, 17-inch Trinitron monitor produces sharp graphics; its intuitive pushbutton controls are much easier to master than most on-screen interfaces. Even the audio sounds good—an Altec Lansing ACS 295 satellite and subwoofer set is paired with a new Turtle Beach Systems PCI sound card. Bundled software includes Microsoft Office SBE and Encarta 98, plus McAfee AntiVirus and audio tools.

Inside, we found a clean design with three free ▶

drive bays and two open PCI slots. A 56-kbps modem occupies the lone ISA slot. The Dimension case, though, is all but impossible to open, and the Dell QuietKey keyboard defies its name, making a lot of sharp clicking during typing.

The useful setup guides and manuals should put novices at ease. Dell provides 24-hour toll-free tech support and a three-year parts warranty. Some of our readers, though, have complained about long times on hold when calling Dell support.

5 DELL OPTIPLEX GXA 333

PRO: Very fast, easy to upgrade, comes with system management software, high-quality monitor

CON: No business applications included

Dell's new high-end corporate PC, the OptiPlex GXa 333, is an IS manager's dream come true. This new Windows NT–equipped Pentium II-333 with an easy-open case includes Wake-on-LAN capability to perform remote inventory checks and upgrades. It's very fast—with a PC WorldBench score of 213, the GXa 333 should perform at twice the speed of a Pentium MMX-200—and at $2718 this midtower is reasonably priced for a high-performance, high-quality machine.

Dell Optiplex GXa 333

PCs don't get any easier to open and upgrade than the GXa 333: Press a button on the front of the case, and the left panel swings up and off. The power supply ▶

TOP 20 POWER DESKTOPS — TEST REPORT

	SYSTEM	CPU	Operating system	RAM (MB)	Secondary cache (KB)	PC WorldBench 98 score
1	Gateway GP6-400*	Pentium II-400	Win 95	64	512	204
2	Micron Millennia 400 DVD Edition*	Pentium II-400	Win 95	64	512	210
3	Micron Millennia 350 Personal Edition*	Pentium II-350	Win 95	64	512	194
4	Dell Dimension XPS R400*	Pentium II-400	Win 95	64	512	199
5	Dell OptiPlex GXa 333*	Pentium II-333	Win NT 4.0	64	512	213
6	Gateway G6-333	Pentium II-333	Win 95	64	512	179
7	Dell Dimension XPS R350	Pentium II-350	Win 95	64	512	187
8	Compaq Deskpro EP Model 6400/6400CDS	Pentium II-400	Win 95	64	512	200
9	HP Vectra VL Series 8	Pentium II-400	Win 95	64	512	207
10	Gateway E-3110 333	Pentium II-333	Win 95	64	512	163
11	Quantex QP6/300 SM-4x	Pentium II-300	Win 95	64	512	151
12	NEC PowerMate Enterprise 8000	Pentium II-333	Win 95	64	512	175
13	HP Vectra VL Series 7	Pentium II-333	Win NT 4.0	64	512	218
14	Quantex QP6/300 SM-4xSE	Pentium II-300	Win 95	32	512	136
15	Kingdom Pinnacle PII-333	Pentium II-333	Win 95	64	512	181
16	Sys Technology Performance Pro 300LA	Pentium II-300	Win NT 4.0	64	512	213
17	EPS Evolution XP PII-333	Pentium II-333	Win 95	64	512	177
18	Sys Technology Performance Pro 333H2	Pentium II-333	Win NT 4.0	64	512	220
19	Everex StepStation 2 P2-300	Pentium II-300	Win NT 4.0	64	512	205
20	Vektron Super Power Station PII-300	Pentium II-300	Win 95	64	512	163

*Best Buy

Word 97 · Word Pro 97 · Excel 97 · 1-2-3 97 · Paradox 8.0 · Picture Publisher 7.0

TEST PC WORLD CENTER

HOW WE TEST All systems are tested with PC WorldBench 98, *PC World's* application-based benchmark. A higher PC WorldBench score is better. All PCs are tested with either Windows 95 or Windows NT 4.0, and video resolution is set to 800 by 600 in 65,536 colors. We run automated scripts on six popular business applications, performing common tasks such as spelling checks, scrolls, saves, sorts, and recalculations. The PC WorldBench 98 score is a sum of the weighted, normalized result of each script: Word 97 (10 percent), Word Pro 97 (10 percent), Excel 97 (20 percent), 1-2-3 97 (20 percent), Paradox 8.0 (20 percent), and Picture Publisher 7.0 (20 percent). For more details on our benchmark and how we run it, see PC World Online (www.pcworld.com/testing). [1]Under Windows 95.

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swivels out of the way for easy motherboard access. All the expansion slots—six open and one holding an Intel EtherExpress 10/100 network card—sit on a removable cage that can be easily withdrawn and reinserted.

The good-looking, 17-inch Dell 1000HS Trinitron monitor features a button for toggling between three modes, including a graphics/video mode for boosting contrast. In our tests, however, it made photos look unnatural. The integrated ATI Xpert@Work graphics card comes with 4MB of SGRAM. The 12X–24X CD-ROM drive, integrated 16-bit sound, and Altec Lansing ACS90 speakers aren't top-of-the-line but are fine for a business machine.

Dell covers the cost of parts for three years and labor for one, while technical support lines are open 24 hours a day. Recently, though, we've had to wait 20 to 40 minutes on hold for a representative.

New This Month

The following PCs made our power desktops chart for the first time this month. For original reviews of previously tested PCs on the chart, visit our Web page (www.pcworld.com/top400).

7 DELL DIMENSION XPS R350

PRO: DVD-ROM drive, enormous hard disk, fast performance, Trinitron monitor

CON: Pricey, case is difficult to open

If you're lusting after that 400-MHz Dell system but can't afford a penny more than $3000, consider the $2999 Dell Dimension XPS R350. It comes with all the goodies you'll find in its more expensive sibling. And this PII-350 turned in a PC WorldBench score of 187, placing it dead center among the three systems we've tested in its CPU class.

Both Dimensions we tested came with the same cavernous 14GB IBM ATA-33 hard disk—the largest of any we've seen to date—and an Iomega Zip drive, as well as the same 2X DVD-ROM drive. Combined with the stunning 17-inch Trinitron monitor and fast STB Nvidia Plus graphics card, the DVD-ROM drive will let you enjoy crystal-clear MPEG-2 video and the latest multimedia titles. The software bundle, though, is all business: It includes Microsoft Office SBE, Encarta, and Street Maps.

Dell Dimension XPS R350

The Dimension's midtower case includes a platform base for extra stability, but the side panel is hard to remove. The interior is well laid out, with a fan that blows air directly onto the heat sink.

Dell provides good documentation, including a foldout setup guide and troubleshooting manuals. Dell also offers 24-hour toll-free tech support that our readers rate as superior. However, we've seen hold times increase over the past year.

8 COMPAQ DESKPRO EP MODEL 6400/6400CDS

PRO: Network ready, includes modem

CON: Slightly slow for a PII-400

The real story behind this Pentium II-400 Compaq Deskpro is its versatile design and useful management features. This well-crafted corporate PC offers networking capabilities, including a 100-mbps ethernet card and utilities for starting and configuring the system from a central server. But subpar performance and watered-down components keep it out of Best Buy territory.

Compaq Deskpro EP

At $3079, this Deskpro is priced in the middle of the 400-MHz pack, but its PC WorldBench score of 200 puts it near the bottom among its peers. Still, the system outpaces all Windows 95 PCs based on slower CPUs and includes a 56-kbps modem. But other components fall short. The 6.4GB hard disk is about 2GB smaller than the average for Top 20 power systems—and is less than half the size of the largest drives—while the 12X–24X CD-ROM drive is slower than most. The system also lacks a Zip drive.

The 6400CDS benefits from Compaq's attention to quality. This sturdy system features an innovative design that can mount drives either vertically or horizontally, allowing for proper orientation whether the case is set as a desktop or a tower. The case opens easily to reveal a spacious interior with a duct that channels blown air directly onto the CPU.

Compaq offers toll-free technical support 24 hours a day and provides a three-year warranty on parts (one on labor). Our calls to the support line revealed competent technicians and timely service, and system documentation is thorough.

9 HP VECTRA VL SERIES 8

PRO: Blazing performance, nice design, affordable for a PII-400, comes with ethernet adapter

CON: No weekend support, no modem

This is not your father's Hewlett-Packard. Corporate PCs were once all overpriced and underpowered, but HP sheds that stodgy image with its Vectra VL Series 8. This Pentium II-400 powerhouse is one of the fastest PCs we've tested, yet at $2750 it is the least expensive in its class.

The Vectra VL Series 8 shows its corporate roots with a bundled 100-mbps 3Com EtherLink XL ethernet adapter and HP's TopTools network management software for configuring the system remotely. Inside the pale-gray midsize tower, a polished interior welcomes upgrades. Expansion card slots are mounted on a vertical riser plane, and you can slide the motherboard out of the case without removing any connectors. All interior cables are tied off and out of the way, while the chassis exhibits very little flex even with the cover off.

Buyers expect a PII-400 system to be fast, and the Vectra VL Series 8 does not disappoint. With a PC WorldBench score of 207, it finished second only to the Micron Millennia 400 DVD Edition. Although the HP is $548 cheaper than the Millennia, it does not include the DVD-ROM and Zip drives found in that consumer-oriented machine. The massive 10GB IBM hard drive is welcome, and the system otherwise matches up well with the PII-400 competition by having a 12X–32X CD-ROM drive and a 4MB AGP graphics card. It lacks a modem—but that's not a ▶

HP Vectra VL Series 8

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critical omission in a corporate PC that's already outfitted with a network card.

Though HP offers a lengthy three-year warranty on parts and labor, telephone support is weak. There is no toll-free technical support line, and the company charges for calls after the first year. Also, support hours are limited to 11 hours each weekday—none on weekends. HP's manuals, however, are exhaustive.

10 GATEWAY E-3110 333

PRO: 19-inch monitor, ethernet adapter, good sound system

CON: Slow; small power supply

This stylish, corporate-minded midtower scored a meager 163 on our PC WorldBench suite, making it the second-slowest Pentium II-333 we've tested. But it's redeemed by great features.

The $2747 E-3110 333 is one of the few Top 20 systems with a 19-inch monitor. It also includes both a 3Com 100-mbps PCI-based ethernet adapter and a Gateway Telepath 56-kbps modem inside its case. The modem's desktop microphone and answering machine software are unusual (and welcome) in a corporate PC. Intel's LANDesk Client Manager software offers remote maintenance. An 8.4GB hard disk and an Iomega Zip drive provide ample storage.

Gateway E-3110 333

With 8MB of SGRAM, the Rage Pro Turbo 2X supports resolutions up to 1280 by 1024 on the big screen and is matched with an ATI Xpert@Work AGP graphics card. The speaker set has no subwoofer, but the Altec Lansing ACS41 units produce nicely balanced audio.

There are thoughtful touches in the system, such as color-coded rear ports and cables, and well-organized recovery and driver disks. The E-3110 333 comes with Gateway's sterling manuals. The system case's side panel slides off easily; the interior is a bit cramped around the upper drive bays—complicating drive upgrades—but other components are easy to access. Plenty of slots and bays are available.

The rubber feet on our test unit were slightly off level, causing the PC to rock a bit when touched. Also, the reset button must be pushed hard, and the power supply is only 200 watts. But Gateway offers a superb three-year parts and labor warranty and round-the-clock phone support.

15 KINGDOM PINNACLE PII-333

PRO: Fastest Win 95 PII-333, has DVD-ROM drive

CON: Poor keyboard, short tech support hours

With a PC WorldBench score of 181, the Kingdom Pinnacle PII-333 is the fastest Windows 95–based Pentium II-333 system we've tested. A month ago, that would have made it the fastest PC ever, but a parade of 350- and 400-MHz PII PCs have stolen the Pinnacle's thunder. Still, this $2397 model has lots to offer.

A Creative Labs PC-DVD Encore drive and media card let you play the latest titles and MPEG-2 video, while enjoying 20X spin rates for CD-ROM software. The media card uses an external pass-through cable to mate MPEG-2 video with Windows graphics, avoiding conflicts if you change the graphics card. A SkyMaster joystick, an ATI Xpert@Work 3D graphics card with 4MB of SGRAM, and a 17-inch monitor that delivers eye-pleasing 3D graphics and video will all please gamers. An Altec Lansing speaker-and-subwoofer set—matched with Creative's Sound Blaster AWE64 sound card—produces high audio quality and volume.

The PC's sturdy cover is easy to remove, but our test unit's motherboard had some flex. In the roomy interior, cables were tied off neatly, allowing access to the three free PCI and ISA slots. The back ports are not color-coded (though the manuals include a helpful user guide), and the spongy keyboard may tire your fingers. The Pinnacle comes with Microsoft Office 97 SBE and Compton's Encyclopedia.

Kingdom Pinnacle PII-333

Kingdom offers 15.5 hours of phone support on weekdays and Saturdays. Its variable parts warranty provides five years of coverage on the CPU and RAM, and three years on all other components; labor is covered for a year. Our recent calls to Kingdom's support resulted in long delays and less-than-stellar answers to questions.

17 EPS EVOLUTION XP PII-333

PRO: Great 3D graphics card, good monitor

CON: Poor keyboard

The EPS Evolution XP PII-333, an affordable Pentium II-333 midsize tower, comes equipped for both home and office duty—it includes Microsoft Office 97 and top-notch 3D graphics. At $2445, the XP PII-333 is among the least expensive systems on our power chart, but its below-average performance and a few rough edges prevent the PC from climbing any higher.

EPS Evolution XP PII-333

Power gamers will like the Diamond Multimedia Monster 3D card. It provides some of the best 3D graphics acceleration around and augments the ATI Xpert@Work AGP card, which has become a fixture on our *Top 10 Graphics Boards* charts. The 17-inch monitor uses a Trinitron-like shadow mask that produces sharper and brighter pixels. An Ensoniq Audio PCI sound card drives the Altec Lansing ACS45 speaker and subwoofer.

The system comes with Microsoft Office 97 SBE and Money 98 software, and a built-in Zip drive allows for easy backups and file sharing. The 8.4GB hard disk and 12X–32X CD-ROM drive are typical for PCs on our Power Desktops chart. The keyboard's keys feel spongy and can fatigue your hands fairly quickly, and the backspace key is simply too small. Inside the Evolution's case, a pair of free DIMM sockets and three PCI slots (one holding the extra graphics card) leave plenty of room for upgrades.

You get a lot of hardware for your buck here, but we have no data on EPS's record of service and reliability. The company does provide a long three-year parts and labor warranty, as well as 14 hours of weekday telephone support and additional Saturday hours. Documentation is limited to the basic component manuals. EPS's techs flubbed our easiest question, but their answers were otherwise accurate, and they picked up the phone within minutes. ▶

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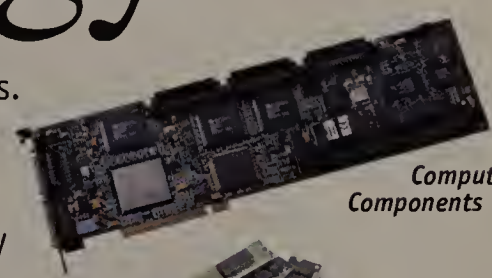

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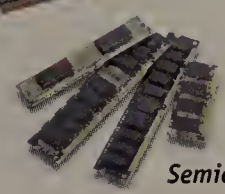

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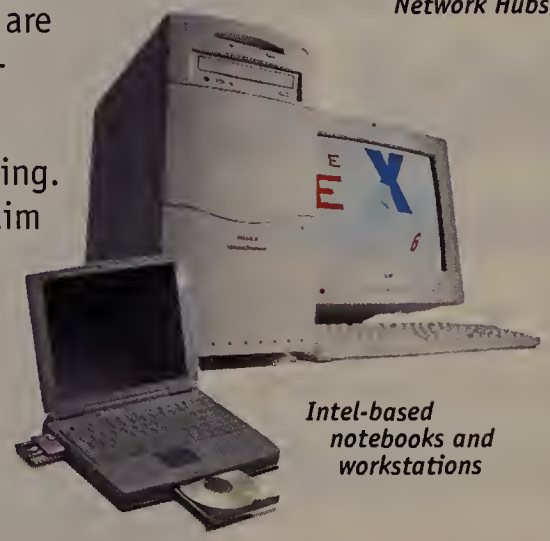

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PC WORLD

TOP 20 BUDGET DESKTOPS

	SYSTEM	Last month	Month tested	Street price (4/10/98)	CPU	Comments
1	Gateway G6-300b 800/846-2000 www.gateway.com	n/a	NEW	$2125	Pentium II-300	Second-fastest budget PC offers balanced configuration, MS Office.
2	Gateway E-3110 300 800/846-2000 www.gateway.com	n/a	May 98	$1999	Pentium II-300	PII-300 sheds 19-inch CRT and $586 for budget fame, has LAN card.
3	Quantex QP6/266 M-2X 800/896-4898 www.quantex.com	n/a	NEW	$1499	Pentium II-266	Sluggish but affordable PII-266 offers gobs of software, nice monitor.
4	Unicent Avanta L333 800/308-3614 www.unicent.com	n/a	June 98	$2049	Pentium II-333	$350 off loaded PII-333 with long warranty; phone support could be better.
5	NEC Direction SPL 333 888/863-2669 www.necnow.com	n/a	May 98	$2067	Pentium II-333	$420 off polished midtower propels it from power to budget Best Buy.
6	CyberMax PowerMax 7 800/437-4596 www.cybermaxpc.com	4	May 98	$1949	Pentium II-300	$250 off last month, but competition is tougher.
7	Micro Express MicroFlex-B833 800/989-9900 www.microexpress.net	n/a	NEW	$1349	Pentium II-233	Low cost gets serious: fast PII-233, but small hard disk and monitor.
8	Micro Express MicroFlex-F300e 800/989-9900 www.microexpress.net	6	May 98	$1799	Pentium II-300	$100 off and faster modem keep this DVD-equipped PC in the hunt.
9	Dell Dimension XPS D266 800/388-8542 www.dell.com	3	May 98	$2199	Pentium II-266	Well-supported PII-266 with Office 97 slips behind chart newcomers.
10	Quantex QP6/300 SB-4x 800/896-4898 www.quantex.com	n/a	May 98	$2099	Pentium II-300	$200 price drop boosts powerful business PC; tested with Windows NT 4.0.
11	Micro Express MicroFlex-B2450 800/989-9900 www.microexpress.net	5	June 98	$1499	AMD K6-233	Well-configured, with fine sound; faster than most AMD K6-233s and MMX-233s.
12	ProGen Polaris PII-333 888/776-9595 www.progen.com	n/a	May 98	$1749	Pentium II-333	Huge $449 price slash moves this quick PC onto the chart.
13	Tagram Thunderbolt H2630 800/824-7267 www.tagram.com	7	June 98	$2199	Pentium II-333	Fast Windows 95 PC includes Zip drive; support drops off after three years.
14	Polywell Poly K6266Mx 800/999-1278 www.polywell.com	12	May 98	$1595	AMD K6-266	Price down $300 on expandable AMD K6; unresponsive support in last two months.
15	ProGen Polaris PII-350 888/776-9595 www.progen.com	n/a	NEW	$2149	Pentium II-350	Poor case choice and design; interior is inaccessible and cramped.
16	Dell OptiPlex GXa 266 800/388-8542 www.dell.com	n/a	May 98	$2174	Pentium II-266	LAN-savvy PC jumps to budget chart after $260 price cut.
17	MidWest Micro Office Pro-300 800/728-8582 www.mwmicro.com	15	June 98	$1669	Pentium II-300	Price slashed $330; quick machine, but phone support erratic.
18	Micron Millennia 200 888/634-8799 www.micronpc.com	9	May 98	$1794	Pentium MMX-200	Name change for multimedia PC with terrific sound card and speakers.
19	Polywell Poly 700L5 PII 300 800/999-1278 www.polywell.com	13	May 98	$1999	Pentium II-300	$151 cut; PCI graphics card installed; possible support problems.
20	Gateway E-1000 233 800/846-2000 www.gateway.com	n/a	NEW	$1238	Pentium MMX-233	A cramped interior in inexpensive, network-ready desktop.

Best Buy See features chart, page 232; test report, page 234.

n/a = not applicable

[1] A system's performance word score is relative to scores of other PCs running the same operating system. For more details see "Your Guide to the Top 100."
[2] For more information about all products in this table, circle reader service no. 909.

THE BUDGET DESKTOPS CHART continues to bulk up on PCs emigrating from the power list, with four systems making the switchover after steep price cuts. The new $2125 Gateway G6-300b steals the top spot with a 17-inch monitor, 8.4GB hard disk, and terrific PC WorldBench 98 score of 173. The $1349 Micro Express MicroFlex-B833—also new—features a Pentium II-233 CPU and 64MB of RAM. As Intel cuts prices, rival chips are becoming scarce. Only the Micro Express MicroFlex-B2450 and Polywell Poly K6266Mx use non-Intel CPUs. Two Pentium MMX systems missed the charts: the $999 Seanix Baby Grand-CS and $1184 Acer AcerPower Flex4000. Both have small hard disks and run too slowly.

SCORECARD

★ Overall rating	PC WorldBench 98/operating system	Features and design	Price	Performance [1]	Vendor's system reliability	Vendor's support quality/policies	Reader service number [2]
86	173/Win 95	very good	expensive	outstanding	average	above average/best	825
83	172/Win 95	good	average	outstanding	average	above average/best	826
82	138/Win 95	very good	inexpensive	good	average	average/best	827
80	158/Win 95	very good	average	very good	[3]	[3]/best	828
80	169/Win 95	very good	average	outstanding	below average	average/good	829
80	152/Win 95	very good	average	very good	[3]	[3]/best	830
80	144/Win 95	good	inexpensive	good	[3]	[3]/best	831
79	161/Win 95	good	average	very good	[3]	[3]/best	832
79	142/Win 95	good	expensive	good	above average	above average/best	833
79	198/NT 4.0	good	average	outstanding	average	average/best	834
78	140/Win 95	good	inexpensive	good	[3]	[3]/best	835
78	172/Win 95	good	average	outstanding	[3]	[3]/fair	836
78	171/Win 95	very good	expensive	outstanding	[3]	[3]/fair	837
78	145/Win 95	very good	average	good	[3]	[3]/good	838
78	181/Win 95	very good	expensive	outstanding	[3]	[3]/fair	839
78	144/Win 95	good	expensive	good	above average	average/best	840
77	161/Win 95	good	average	very good	[3]	[3]/fair	841
77	115/Win 95	good	average	satisfactory	above average	above average/best	842
76	159/Win 95	very good	average	very good	[3]	[3]/good	843
76	111/Win 95	satisfactory	inexpensive	satisfactory	average	above average/best	844
Scorecard weightings ▶		Features 25 percent	Price 22 percent	Performance 18 percent	Reliability 15 percent	Quality/policies 10 percent each	

[3] Insufficient data to give a rating.

This Month's Best Buys

1 GATEWAY G6-300B

PRO: Terrific price, good speed for its CPU class

CON: Can't put peripherals on curved case top

Gateway has tweaked its G6-266b—a two-time Budget Desktops champ—to come up with a pair of winning systems: the G6-300b and G6-266b. With a PC WorldBench score of 173, the $2125 G6-300b is faster than all other Windows 95 systems on the budget chart save for the ProGen Polaris PII-350, and offers twice the RAM and almost double the hard disk capacity of its PII-266 predecessor. The G6-300b's near twin, the new GP6-266b, includes a DVD-ROM drive and an enormous 10GB hard disk but only 32MB of RAM. At $2053, the 266b is nearly as pricey as the 300b, yet it lags in performance with a PC WorldBench 98 score of 152.

Gateway G6-300b

Amazingly, both machines are the fastest in their respective CPU classes. Because the two PCs are so similar, only the higher-rated 300b appears here. Outfitted with 64MB of RAM and a generous 8.4GB hard disk, it comes with a 13X–32X CD-ROM drive (the fastest-rated you can buy), and you save about $200 over the price of a DVD-ROM–equipped PC. The 4MB STB Velocity 128 graphics adapter has a TV-out port. The 17-inch monitor provides decent graphics at resolutions up to 1024 by 768.

The G6-300b's curvaceous chassis is eye-catching and easy to remove, but it prevents you from putting anything on top. Inside, two PCI slots and an ISA slot are available. Adding a second internal drive will require removing the existing one, but there's enough space on the inside end of the two available external bays to make installations of an internal Zip, tape, or CD-R drive reasonably easy.

The user guide integrates all components and is clear, concise, well illustrated, and complete. The company bundles Microsoft's Office 97 SBE, Bookshelf 98, Streets 98, a couple of games, and a free month of the Gateway.net ISP. The Altec Lansing ACS41 speakers are fine for business use. Gateway system reliability and support quality rate as outstanding and above average, respectively. In recent anonymous calls, support personnel have answered promptly on the 24-hour toll-free lines. Gateway's warranty is for three years on both parts and labor.

2 GATEWAY E-3110 300

PRO: Easy-off external case, bundled LAN adapter and client management software, top-tier support policies

CON: Curved case top makes stacking external components difficult

Great performance and good components help the Gateway E-3110 300 stand out. A Best Buy on the power chart just a month ago, the ▶

PHOTOGRAPHS: KEN SMITH

TOP 20 BUDGET DESKTOPS — STANDARD FEATURES

	SYSTEM	CPU	Operating system	RAM (MB)	Secondary cache (KB)	Hard drive (GB)	Graphics adapter	Video RAM (MB/type)	Monitor tube/ viewable diagonal (inches)	Modem speed (kbps)
1	Gateway G6-300b*	Pentium II-300	Windows 95	64	512	8.4	STB Velocity 128 (AGP)	4/SGRAM	17/15.9	56 [2]
2	Gateway E-3110 300*	Pentium II-300	Windows 95	64	512	8.4	ATI 3D Rage Pro Turbo PC2TV	8/SGRAM	17/15.9	not included
3	Quantex QP6/266 M-2X*	Pentium II-266	Windows 95	32	512	4.1	STB Velocity 128 (AGP)	4/SGRAM	17/16.1	56 [3]
4	Unicent Avanta L333*	Pentium II-333	Windows 95	64	512	8.4	ATI Xpert@Work (AGP)	4/SGRAM	17/15.9	56 [2]
5	NEC Direction SPL 333*	Pentium II-333	Windows 95	64	512	6.4	Diamond Viper V330 (AGP)	4/SGRAM	17/16	56 [2]
6	CyberMax PowerMax 7	Pentium II-300	Windows 95	64	512	8.4	STB Velocity 128 (AGP)	4/SGRAM	17/16.1	56 [3]
7	Micro Express MicroFlex-B833	Pentium II-233	Windows 95	64	512	4.3	STB Velocity 128 (AGP)	4/SGRAM	15/13.7	56 [2]
8	Micro Express MicroFlex-F300e	Pentium II-300	Windows 95	64	512	4	ATI Xpert@Work (AGP)	8/SGRAM	17/15.8	56 [3]
9	Dell Dimension XPS D266	Pentium II-266	Windows 95	32	512	4	STB Velocity 128 (AGP)	4/SGRAM	17/15.8	56 [2]
10	Quantex QP6/300 SB-4x	Pentium II-300	Windows NT 4.0	64	512	6.4	Diamond Viper V330 (AGP)	4/SGRAM	19/16.1	56 [3]
11	Micro Express MicroFlex-B2450	AMD K6-233	Windows 95	64	1024	4.3	ATI Xpert@Work	4/SGRAM	17/15.8	56 [3]
12	ProGen Polaris PII-333	Pentium II-333	Windows 95	64	512	8.4	Number Nine Revolution 3D	8/VRAM	17/16	56 [2]
13	Tagram Thunderbolt H2630	Pentium II-333	Windows 95	64	512	6.4	ATI Xpert@Work (AGP)	8/SGRAM	17/16.1	56 [3]
14	Polywell Poly K6266Mx	AMD K6-266	Windows 95	64	512	7	Diamond Stealth 3D 2000 Pro	4/EDO DRAM	17/15.8	56 [3]
15	ProGen Polaris PII-350	Pentium II-350	Windows 95	64	512	8.4	Intel Express 3D	4/SGRAM	17/16	56 [2]
16	Dell OptiPlex GXa 266	Pentium II-266	Windows 95	32	512	3.2	integrated ATI 3D Rage Pro	4/SGRAM	17/15.9	not included
17	MidWest Micro Office Pro-300	Pentium II-300	Windows 95	32	512	6.4	ATI Xpert@Work (AGP)	4/SGRAM	17/16.1	not included
18	Micron Millennia 200	Pentium MMX-200	Windows 95	32	512	3.2	Diamond Stealth 3D 2000 Pro	4/EDO DRAM	17/16	56 [2]
19	Polywell Poly 700L5 PII 300	Pentium II-300	Windows 95	64	512	7	Diamond Fire GL 1000 Pro	8/SGRAM	17/15.7	56 [3]
20	Gateway E-1000 233	Pentium MMX-233	Windows 95	32	512	2.1	integrated S3 Trio 64V2/DX	2/DRAM	15/13.9	56 [2]

* Best Buy

[1] *PC World* defines towers as taller than 20 inches, midtowers as 15.5 inches to 20 inches, and minitowers as shorter than 15.5 inches.
[2] Downloads only, uploads at 33.6 kbps; uses 3Com/U.S. Robotics' x2 technology.

machine notched a PC WorldBench score of 172—very peppy for a PII-300 system. The Gateway E-3110 also includes hot add-ons for corporate PCs like an SMC EtherPower II 10/100 network interface card to support an easy high-speed network connection, as well as DMI-2 client management software that lets LAN administrators track changes and upgrade the system remotely.

Outfitted with a 17-inch monitor for the budget chart (it was configured with a 19-inch monitor the previous month), the reconfigured E-3110 300 costs $1999, $586 less than last month. The system comes with an 8.4-GB hard drive, a Gateway EV700 monitor, and an ATI 3D Rage Pro Turbo PC2TV graphics card that includes 8MB of SGRAM and video ports. Also surprising for a corporate box: an Ensoniq Audio PCI sound card and reasonably good-sounding Altec Lansing ACS41 speakers. Like most other PCs sold specifically for hookup to a LAN, the E-3110 does not come with a modem.

Color-coded cables and ports make attaching peripherals easy. The cover is a breeze to remove too: Just twist off the two large screws with your fingers, and you can slide back the side panel to reveal the orderly interior. Gateway's support policies are terrific, including a three-year parts and labor warranty and 24-hour toll-free technical support.

Gateway E-3110 300

3 QUANTEX QP6/266 M-2X

PRO: Great software bundle, crisp monitor, TV tuner

CON: Slow performance, poor speakers

With the Quantex QP6/266 M-2X, compromise is the name of the game. This Pentium II-266 is not the fastest PC you can buy—in fact, its 138 PC WorldBench score makes it the slowest PII-266 we've tested—but at $1499 it costs at least $500 less than any other Best Buy PC. Add a pile of useful software and Quantex's extensive support policies, and the M-2X makes a fine budget-minded system for the home or office.

Quantex cut a few corners to achieve the low price. The system comes with 32MB of RAM—half the amount used in most PCs on the budget chart—and the 4.1GB

		EXPANDABILITY					CUSTOMER SUPPORT			
CD/DVD-ROM drive speed	Sound board	Case style [1]	Max. RAM (MB)	Open RAM sockets	Open drive bays (ext./int.)	Open slots	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
13X-32X	Ensoniq Audio PCI	midtower	384	1	2/3	3	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
13X-32X	Ensoniq Audio PCI	midtower	384	2	3/2	3	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
13X-32X	Ensoniq Audio PCI	midtower	384	2	3/3	4	3/1	24	Sat., Sun.	BBS, WWW
14X-32X	Ensoniq Audio PCI	midtower	384	2	3/1	4	5/3	24	Sat., Sun.	BBS, WWW
14X-32X	integrated Yamaha OPL3-Sax	midtower	384	1	3/1	4	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
13X-32X	Ensoniq Audio PCI 9752	midtower	512	2	3/3	4	3/1	24	Sat., Sun.	BBS, WWW
12X-24X	Sound Blaster AWE64	midtower	512	2	3/0	4	4/4	24	Sat., Sun.	WWW
14X-32X	Super Sound32 32W-3D	midtower	512	2	3/0	4	4/4	24	Sat., Sun.	WWW
14X-32X	Turtle Beach Montego	midtower	384	2	3/1	3	3/1	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
14X-32X	none	midtower	512	2	3/3	5	3/1	24	Sat., Sun.	BBS, WWW
2X DVD-ROM	Sound Blaster AWE64	midtower	768	1	3/0	3	4/4	24	Sat., Sun.	WWW
14X-32X	S3 SonicVibes PWA32 WaveTable	midtower	1024	2	2/1	0	3/1	9	none	BBS, WWW
12X-24X	Ensoniq Audio PCI	midtower	384	2	3/0	4	3/1	24	Sat., Sun.	BBS, WWW
12X-24X	CS37-3DIS	midtower	256	4	3/0	4	3/5	24	Sat., Sun.	WWW
12X-32X	Aureal Vortex PCI Audio	midtower	384	2	3/1	3	3/1	9	none	BBS, WWW
12X-24X	integrated Crystal 4623B	midtower	384	2	2/1	7	3/1	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
12X-24X	Ensoniq Audio PCI	midtower	512	2	3/1	5	varies [4]/3	12	Sat.	BBS, WWW
12X-24X	Sound Blaster AWE64	midtower	256	1	2/1	3	3/1	24	Sat., Sun.	BBS, CIS, WWW
12X-24X	Yamaha OPL3-Sax	midtower	1024	3	3/0	3	3/5	24	Sat., Sun.	WWW
13X-32X	integrated Crystal Audio System	desktop	256	1	0/0	1	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW

[3] Downloads only, uploads at 33.6 kbps; uses Rockwell-Lucent's K56flex technology.
[4] Five years on CPU and system memory, three years on all other parts.

hard disk is among the smallest installed on chart-making systems. But Quantex packs on the software, throwing in business applications such as Microsoft Office 97 SBE, the Learning Company's Project Manager Pro, Compton's Reference Collection, and SoftKey's OfficeMate, Form Designer Pro, and Day Planner software.

The 17-inch Mag 720V2 monitor impressed us with pleasing images—a critical advantage for those who work long hours—and includes the innovative Jag control dial for adjusting display settings. In addition, the STB Velocity 128 AGP graphics card comes with 4MB of SGRAM and provides first-rate 2D and 3D acceleration, though video playback is poor. Unfortunately for audiophiles, the Altec Lansing ACS90 speakers sound tinny and lack the range needed for producing extreme highs and lows.

Quantex QP6/266 M-2X

Upgrades are eased by the conveniently designed case, which slides right off after removing three thumbscrews. Manuals provide comprehensive technical information, and one booklet shows you how to access the Internet with the generic 56-kbps (K56flex) modem—but not how to make the modem work with the included desktop microphone or Ring Central telephony software. Quantex staffs the phones 24 hours a day every day and provides a three-year parts and one-year labor warranty.

4 UNICENT AVANTA L333

PRO: One of the lowest-price Pentium II-333s we've seen, very expandable

CON: Slow for its processor class, mediocre keyboard, merely adequate system manual

At $2049, this well-configured Pentium II-333 midtower costs $350 less than it did last month, when it narrowly missed being a power desktops Best Buy. Despite sluggish performance—the PC WorldBench score of 158 is lowest among the PII-333s we've tested—the Avanta L333 delivers a good configuration and excellent support policies for the price.

High-quality components include an 8.4GB hard drive big enough to handle the bundled Microsoft Office 97 SBE suite, and multimedia features like the ▶

Ensoniq Audio PCI card, Altec Lansing ACS90 speakers, and a 14X–32X CD-ROM drive. An ATI Xpert@Work graphics card (one of the best AGP boards we've tested) quickly feeds graphics to a 17-inch monitor. We liked the included Microsoft IntelliMouse, but the Mitsumi keyboard was too noisy and felt flimsy.

Getting inside is easy—just pop off the front panel. Four free slots and four open drive bays provide expandability; the bays are mounted on a removable module.

Unicent Avanta L333

Unicent offers top-notch support policies, including 24-hour support. You might need it: A Windows 95 manual and documentation for the motherboard is all you get. In our latest round of support calls, Unicent's responsiveness and accuracy were adequate, though we sat on hold for about 15 minutes.

5 NEC DIRECTION SPL 333

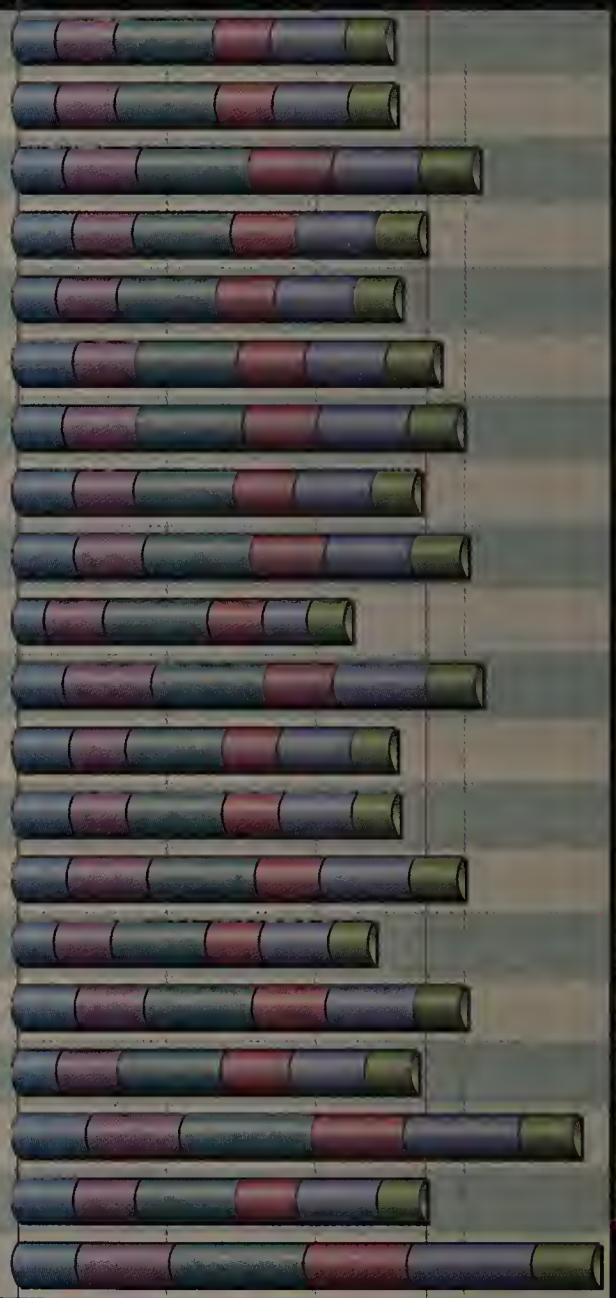
PRO: Well designed and well built, good price for a PII-333, nice graphics card and monitor combo

CON: Audio is basic

NEC's Direction SPL 333 was a good system when it landed fifth on our Power Desktops chart last month. But after a stiff $420 price cut to $2067 and an upgrade to a 12X–32X CD-ROM drive, this midtower gets even better. An average performer for a Pentium II-333, its PC WorldBench score of 169 ▶

TOP 20 BUDGET DESKTOPS — TEST REPORT

	SYSTEM	CPU	Operating system	RAM (MB)	Secondary cache (KB)	PC WorldBench 98 score
1	Gateway G6-300b*	Pentium II-300	Win 95	64	512	173
2	Gateway E-3110 300*	Pentium II-300	Win 95	64	512	172
3	Quantex QP6/266 M-2X*	Pentium II-266	Win 95	32	512	138
4	Unicent Avanta L333*	Pentium II-333	Win 95	64	512	158
5	NEC Direction SPL 333*	Pentium II-333	Win 95	64	512	169
6	CyberMax PowerMax 7	Pentium II-300	Win 95	64	512	152
7	Micro Express MicroFlex-B833	Pentium II-233	Win 95	64	512	144
8	Micro Express MicroFlex-F300e	Pentium II-300	Win 95	64	512	161
9	Dell Dimension XPS D266	Pentium II-266	Win 95	32	512	142
10	Quantex QP6/300 SB-4x	Pentium II-300	Win NT 4.0	64	512	198
11	Micro Express MicroFlex-B2450	AMD K6-233	Win 95	64	1024	140
12	ProGen Polaris PII-333	Pentium II-333	Win 95	64	512	172
13	Tagram Thunderbolt H2630	Pentium II-333	Win 95	64	512	171
14	Polywell Poly K6266Mx	AMD K6-266	Win 95	64	512	145
15	ProGen Polaris PII-350	Pentium II-350	Win 95	64	512	181
16	Dell OptiPlex GXa 266	Pentium II-266	Win 95	32	512	144
17	MidWest Micro Office Pro-300	Pentium II-300	Win 95	32	512	161
18	Micron Millennia 200	Pentium MMX-200	Win 95	32	512	115
19	Polywell Poly 700L5 PII 300	Pentium II-300	Win 95	64	512	159
20	Gateway E-1000 233	Pentium MMX-233	Win 95	32	512	111



*Best Buy

Word 97 · Word Pro 97 · Excel 97 · 1-2-3 97 · Paradox 8.0 · Picture Publisher 7.0

TEST PC WORLD CENTER **HOW WE TEST** All systems are tested with PC WorldBench 98, *PC World*'s application-based benchmark. A higher PC WorldBench score is better. All PCs are tested with either Windows 95 or Windows NT 4.0, and video resolution is set to 800 by 600 in 65,536 colors. We run automated scripts on six popular business applications, performing common tasks such as spelling checks, scrolls, saves, sorts, and recalculations. The PC WorldBench 98 score is a sum of the weighted, normalized result of each script: Word 97 (10 percent), Word Pro 97 (10 percent), Excel 97 (20 percent), 1-2-3 97 (20 percent), Paradox 8.0 (20 percent), and Picture Publisher 7.0 (20 percent). For more details on our benchmark and how we run it, see PC World Online (www.pcworld.com/testing). [1]Under Windows 95.

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★ EDITORS' CHOICE ★

The AMS Tech Rodéo 5030ECX won Editors' Choice in a test of 21 top-of-the-line notebook computers. The Rodéo 5030ECX finished first in the BAPCo SYSmark32 suite, which tests real-world business applications and came in second in the Intel Media Benchmark suite, which tests multimedia performance.

Computer Reseller News February 2, 1998

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5032ECX	Pentium® II Processor 266MHz	4.0GB HDD	64/128 MB RAM	14.1" XGA TFT	56K Modem	20X CD-ROM	$3795.00
5030ECX	Pentium® Processor 266MHz	4.0GB HDD	64/128 MB RAM	14.1" XGA TFT	56K Modem	20X CD-ROM	$3595.00
5020ECX	Pentium® Processor 233MHz	4.0GB HDD	64/128 MB RAM	14.1" XGA TFT	56K Modem	20X CD-ROM	$3495.00
5000ECX	Pentium® Processor 233MHz	3.1GB HDD	32/128 MB RAM	14.1" XGA TFT	56K Modem	20X CD-ROM	$3295.00

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Circle 12 on reader service card

makes the 333 one of the fastest bargain-priced multimedia systems you can buy.

With 64MB of SDRAM and a 6.4GB hard disk, the Direction SPL 333 matches other top-ranked budget desktops. The graphics card, a Diamond Viper V330 AGP, functions admirably. The 17-inch NEC C700 monitor has extensive controls and a crisp picture. NEC also throws in Microsoft Office 97 SBE version 2—one of the best and most popular business application suites available.

NEC Direction SPL 333

NEC has upgraded its 12X–24X CD-ROM drive to a swift 32X model. But we still have reservations about the integrated Yamaha sound chip, which provides only adequate 16-bit business audio.

NEC offers an excellent three-year warranty on parts and labor, and support quality seems to be improving—we've had little trouble getting through to tech support recently. However, reps were not always accurate in their answers.

New This Month

The following PCs made our budget desktops chart for the first time this month. For original reviews of previously tested PCs on the chart, visit our Web page (www.pcworld.com/t20pcs).

7 MICRO EXPRESS MICROFLEX-B833

PRO: Fastest Pentium II-233 PC, low price

CON: Small hard disk and monitor

Micro Express builds fast, affordable, me-too PCs that land in the middle of our budget chart. It has yet another hit in the MicroFlex-B833, a Pentium II-233 system that costs only $1349. Its PC WorldBench score of 144 ties it for fastest Win 95–based PII-233 we've tested.

The B833 packs 64MB of RAM, and the STB Velocity 128 AGP card provides good all-around 2D and 3D graphics acceleration (it ranks fourth on this month's *Top 10 Graphics Boards*). The 15-inch monitor's 15 separate control buttons must surely be a record. The Sound Blaster AWE64 sound board and MLi-818 speakers produce great sound. Micro Express cut corners on storage, with a 4.3GB hard disk. The 12X–24X CD-ROM drive is also a step behind some other chart makers.

MicroFlex-B833

The inside is well laid out and neatly arranged, with three open PCI slots but only one free ISA slot. Three empty external bays make room for drive upgrades.

Micro Express backs the B833 with a lengthy four-year warranty on parts and labor and 24-hour phone support. Our calls were answered promptly, but one rep pawned us off on a component vendor.

15 PROGEN POLARIS PII-350

PRO: Fast, inexpensive

CON: Support is a big question

ProGen's Polaris PII-350 is among the first PCs to include the Intel Express 3D graphics card, based on the i740 chip. It's also the first PII-350 to land on the budget chart.

At $2149, the Polaris PII-350 is by far the least expensive PII-350 we've tested, yet it comes well equipped for both home and office. With an 8.4GB hard drive and a 12X–32X CD-ROM drive, it matches the best on the chart. The 17-inch Panasonic monitor delivers crisp, bright graphics, while the i740-based graphics chip produces fast 3D graphics acceleration. With a PC WorldBench score of 181, the PII-350 is second-fastest on the budget chart, but the slowest of the three PII-350 PCs we've tested.

ProGen Polaris PII-350

The bundled Microsoft Natural Keyboard has a nice, crisp feel, and the cord is conveniently long, but some users may find the split, curved device distracting. Cursor and function keys are also shrunken, inviting mistakes. The wide-body midsize tower is sturdy, but a supporting crossbar makes it difficult to reach the CPU and DIMM sockets from the side.

Although ProGen's three-year parts and one-year labor warranty is competitive, the company offers a scant 9 hours of technical phone support during weekdays and no weekend service at all.

20 GATEWAY E-1000 233

PRO: Compact case, LAN adapter, attractive price

CON: Not expandable, slow, power button is poorly placed

With both a 100-mbps ethernet adapter and a 56-kbps x2 modem, this slim-line Pentium MMX–233 system is a real communicator. And at $1238, it's darn cheap. But the hard disk is cramped (2.1GB), the CPU underpowered, and the interior short on expansion. Its PC WorldBench score of 111 is 10 percent below the 122 average for Pentium MMX–233s.

E-1000 233 MMX

Doubling the 32MB of RAM to 64MB (using the one available memory socket) would help performance. Both external bays are filled by the 13X–32X CD-ROM and floppy drives, leaving only one PCI slot free. The case is easy to open, but you'll have to slip out the hard drive to reach the DIMM sockets. The placement of the power switch next to the CD-ROM drive load/eject button may result in accidental shutdowns.

The integrated 2MB S3 Trio graphics adapter is adequate for light business use. The 15-inch monitor has nice controls but is too small for more than 800 by 600 resolution. The 16-bit integrated sound works well enough with the basic speakers.

The manual is well written. Gateway reliability and support quality rank as average and above average, respectively. In recent anonymous calls to the 24-hour support lines, the techs were quick and helpful. Gateway's warranty of three years on parts and labor is better than average. ▶

BEYOND THE TOP 20

We evaluated these systems along with the others, but they didn't score high enough to reach the Top 20 Budget Desktops chart. For write-ups, see PC World Online (www.pcworld.com/t20pcs).

- **Acer AcerPower Flex4000**
- **HP Brio 8376**
- **Monorail 8000 PII-266**
- **Premio Apollo LX PII-266**
- **Seanix Baby Grande-CS**

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Mitsubishi LCDs	LCD40	LCD50
Viewable size	14.0"	15.0"
Max Resolution	1024 x 768/75 Hz NI	1024 x 768/75 Hz NI
Weight	9.9 lbs.(4.5kg)	11.7 lbs.(5.3kg)
Dimensions (H,W,D)	14.7 x 14.0 x 6.3"	15.4 x 14.7 x 6.3"
Brightness	180 cd/m²	200 cd/m²
Viewing Angle	H: ±70°, V: +60, -50°	H: ±70°, V: +70, -50°
LCD Type	TFT Active Matrix	TFT Active Matrix

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PC WORLD

TOP 10 NOTEBOOK PCs

	POWER NOTEBOOK	Last month	Month tested	Street price (4/10/98)	CPU	Comments
1	Quantex H 1331 800/896-4898 www.quantex.com	1	June 98	$3299	Pentium II-266	Desktop alternative comes with port replicator, extra battery.
2	Dell Inspiron 3200 D266XT 800/388-8542 www.dell.com	2	June 98	$3199	Pentium II-266	SOHO notebook offers rare mix of latest CPU and low price.
3	Dell Latitude CPi D266XT 800/388-8542 www.dell.com	n/a	NEW	$3799	Pentium II-266	Thin design, crisp keyboard, bright screen on great notebook.
4	Compaq Armada 4220T 800/345-1518 www.compaq.com	4	May 98	$3999	Pentium MMX-266	Unusual battery design and long life make for superb traveling.
5	Gateway Solo 5100 LS 800/846-2000 www.gateway.com	n/a	June 98	$3249	Pentium MMX-266	Light weight, strong battery, big screen highlight this roadster.
	BUDGET NOTEBOOK					
1	Gateway Solo 2300 SE 800/846-2000 www.gateway.com	2	June 98	$1749	Pentium MMX-200	$200 price drop propels inexpensive notebook to top of chart.
2	Acer Extensa 394T 800/733-2237 www.acer.com/aac	4	May 98	$2299	Pentium MMX-200	$200 price drop, marathon battery, light weight.
3	WinBook XL K6 233 800/965-9349 www.winbook.com	1	May 98	$2283	AMD K6-233	Multipurpose notebook with internal CD-ROM, floppy drive, modem.
4	Quantex H 1330 800/896-4898 www.quantex.com	5	Mar 98	$2591	Pentium MMX-233	$108 price cut, bright 13.3-inch screen, fast performance.
5	DTK FortisPro Top5A233 800/289-2385 www.dtkcomputer.com	n/a	June 98	$2090	Pentium MMX-233	Inexpensive and sturdy PMMX-233 comes with MIDI/joystick port.

Best Buy See features chart, page 240.

n/a = not applicable [1] Includes computer, adapter, power cord, and floppy drive or CD-ROM drive. [2] For more information about all products in this table, circle reader service no. 903.

WE HAD OUR FIRST LOOK at a gargantuan 15.1-inch notebook screen this month. It's nearly the size of a 17-inch monitor's viewable area. Yesterday's biggest and baddest screen for notebooks—the 14.4-incher—is already so wide it almost bursts through the plastic frame. So how did the vendors accommodate a 15.1-inch active-matrix screen on the $2999 Micro Express NP8266B and the $3999 Eurocom 8500M? By increasing each notebook's width by about 2 inches, which means that you also get a bigger keyboard. The catch? Some 10.8 pounds of pure misery on your shoulder.

Among budget notebooks, dual-scan screens, which lack the sharpness and high contrast of active-matrix screens, have been on a steady march to the technology graveyard. But several vendors are trying to extend the life of dual-scan displays with a quick fix called HPA (High Performance Addressing) that supposedly improves the screen's contrast and permits a wider viewing angle. However, that's not what we found when we examined the HPA-enhanced screen on the new Hitachi VisionBook Plus 5260. It had the same washed-out look as most other dual-scan screens we've seen. Dell and Gateway will ship HPA notebooks soon. We'll let you know if they succeed in making a silk purse out of a sow's ear.

We tested ten new notebooks this month, but only the Pentium II–powered Dell Latitude CPi D266XT, a magnificently designed machine, made the chart. The Gateway Solo 5100 LS, a fine roadster we tested for June, becomes our new number five power system. On the budget side, the inexpensive yet powerful DTX FortisPro Top5A233, also tested last month, is our number five budget system, while a $200 price cut catapults the Gateway Solo 2300 SE into the top slot.

This Month's Best Buys

POWER NOTEBOOKS

1 QUANTEX H 1331

PRO: Includes port replicator, second battery, and carrying case

CON: Cramped keyboard

For the second month in a row, the $3299 Quantex H 1331 tops our power chart. Not only is the H 1331 an inexpensive desktop alternative, but Quantex sweetens the deal by including a $169 port replicator, a $169 second battery, and a carrying case gratis. Not bad, considering that vendors usually don't give away anything for free.

The Quantex delivers desktoplike per-

SCORECARD

★ Overall rating	PC WorldBench 98 score/performance	Price	Vendor's system reliability	Features and design	Vendor's support quality/policies	Battery life (hours:min)/ rating	Traveling weight [1]	Reader service number [2]
91	142/outstanding	inexpensive	[3]	outstanding	[3]/fair	2:54/poor	average	622
91	145/outstanding	inexpensive	average	outstanding	average/fair	2:58/poor	average	623
90	146/outstanding	average	average	outstanding	average/good	3:44/poor	average	624
84	120/very good	average	average	good	above average/good	7:27/outstanding	light	625
83	117/very good	inexpensive	average	good	below average/fair	5:59/good	light	626
Power scorecard weightings ▶	Performance 22 percent	Price 14 percent	Reliability 22 percent	Features 16 percent	Support 10 percent	Battery life 8 percent	Weight 8 percent	
86	103/very good	inexpensive	average	good	below average/fair	5:52/good	average	627
85	101/very good	average	[3]	very good	[3]/fair	8:20/outstanding	light	628
84	114/outstanding	average	average	good	average/poor	6:22/very good	average	629
83	113/outstanding	average	[3]	outstanding	[3]/good	5:46/good	average	630
83	112/outstanding	inexpensive	[3]	outstanding	[3]/poor	3:21/poor	average	631
Budget scorecard weightings ▶	Performance 14 percent	Price 22 percent	Reliability 22 percent	Features 16 percent	Support 10 percent	Battery life 8 percent	Weight 8 percent	

[1] Insufficient data to give a rating.

formance. Backed by 64MB of SDRAM, the Pentium II-266 CPU posted a hot PC WorldBench 98 score of 142, making it among the fastest notebooks we've ever tested. The notebook's 4GB hard drive provides ample space for software and data. And if you don't use an external monitor, the notebook's 13.3-inch active-matrix screen is big enough to seem like one.

Quantex H 1331

Though not the sharpest-looking notebook around, the black and boxy H 1331 is well built, with no discernible flex in the body or screen panel. Even the CD-ROM drive's tray mechanism seems unusually stable. The uncovered ports on the back are recessed out of harm's way.

You'll appreciate the Quantex's modest 7.4 pounds of heft when you hit the road (an average weight for a notebook but light for a desktop alternative), but you won't like its puny battery life of less than 3 hours—a by-product of the power-hungry PII processor. Evidently, Quantex included the second battery to make the H 1331's short battery life somewhat less debilitating.

Generally, you'll find the H 1331 comfortable to use. Its display is easy on the eyes, though dimmer than some screens—a problem only under the harshest lighting conditions. The small, rectangular keyboard has firm action but carries too many small keys in addition to the normal-size alphanumeric ones—and it's easy to miss those subcompact keys when touch-typing. On the other hand, Quantex did finely tune the touchpad.

You also get the security of a well-written, nicely illustrated user's guide and a three-year warranty on the CPU and memory, but coverage on other parts and labor extends for only one year. Quantex's round-the-clock telephone technical assistance has been sporadic: In our anonymous calls over several months, we twice had to wait more than 30 minutes for help, though we received adequate advice.

Gateway Solo 2300 SE

BUDGET NOTEBOOKS

1 GATEWAY SOLO 2300 SE

PRO: Great price, good performance

CON: Dual-scan screen, no modem

The price war continues to shred price tag after price tag on notebooks. Last month, the Gateway Solo 2300 SE was the first Pentium MMX-200 notebook to break the $2000 barrier. Now a further $200 reduction makes it king of the hill.

How did Gateway get the price down to $1749? Besides responding to market competition, Gateway skipped the modem altogether and went with a 12.1-inch dual-scan screen instead of using costlier active-matrix technology. Like most dual-scans, the Solo's is difficult to view from anywhere but ▶

PHOTOGRAPHS BY KEN SMITH

TOP 10 NOTEBOOK PCs — STANDARD FEATURES

	POWER NOTEBOOK	CPU	Traveling weight (pounds)[1]	RAM (MB)	Hard drive (GB)	Color screen type	Screen diagonal (inches)	Screen resolution	Maximum screen colors	Battery type	Pointing device
1	Quantex H 1331*	Pentium II-266	7.4	64	4	active	13.3	1024 x 768	16.8 million	lithium ion	touchpad
2	Dell Inspiron 3200 D266XT	Pentium II-266	7.4	64	4	active	13.3	1024 x 768	16.8 million	lithium ion	touchpad
3	Dell Latitude CPi D266XT	Pentium II-266	7.6	64	4	active	13.3	1024 x 768	65,536	lithium ion	touchpad
4	Compaq Armada 4220T	Pentium MMX-266	7.2	32	4	active	12.1	800 x 600	16.8 million	lithium ion	touchpad
5	Gateway Solo 5100 LS	Pentium MMX-266	6.4	48	2	active	14.1	1024 x 768	16.8 million	lithium ion	touchpad
	BUDGET NOTEBOOK										
1	Gateway Solo 2300 SE*	Pentium MMX-200	8	32	2	dual-scan	12.1	800 x 600	16.8 million	NiMH	touchpad
2	Acer Extensa 394T	Pentium MMX-200	7.2	32	3.2	active	12.1	800 x 600	65,536	lithium ion	touchpad
3	WinBook XL K6 233	AMD K6-233	8.4	32	2	active	12.1	800 x 600	65,536	lithium ion	eraserhead, touchpad
4	Quantex H 1330	Pentium MMX-233	7.6	64	3.2	active	13.3	1024 x 768	65,536	lithium ion	touchpad
5	DTK FortisPro Top5A233	Pentium MMX-233	8	32	3	active	12.1	800 x 600	16.8 million	lithium ion	touchpad

*Best Buy ● Yes ○ No [1] Includes computer, adapter, power cord, and floppy drive or CD-ROM drive. [2] Downloads only, uploads at 33.6 kbps; uses Rockwell-Lucent's K56flex technology.

directly in front; and the one we looked at was unevenly lit. Still, most people who process words and crunch numbers on their notebooks will be satisfied with the screen and happy to save a little money.

You can also take advantage of the Gateway's docking station port and turn the boxy gray notebook into a desktop alternative with an external monitor. Or you can pull the 8-pound system from the docking station and bring it home or on short trips—without tearing your rotator cuff. When you're away from a wall socket, you'll appreciate the Solo 2300 SE's battery life of nearly 6 hours. But if you travel a lot, do yourself a favor and buy a lighter portable.

The solid-feeling Solo has several useful design features not found on all notebooks. The port covers fold all the way back and attach to the bottom of the unit—a clever trick that helps prevent the covers from breaking. In addition, the snap-out hard drive makes it easy to remove your data from your notebook and lock it in a drawer for safekeeping.

The Solo's single modular bay holds either a CD-ROM drive or a floppy drive. An optional external cable will let you connect both.

The keyboard splits the difference between crisp and mushy. The function keys are large and the touchpad responds adequately. But the buttons below the touchpad are a bit too small for comfort.

As for acoustics, the speakers produce unusually clear sound for a notebook.

In each of our technical support calls to Gateway this month, hold time was less than 10 minutes, which we consider good. The advice was uneven, however: The staff resolved our modem problem correctly but flunked our hard drive question.

Dell Latitude CPi D266XT

New This Month

The following PCs made our power and budget notebook charts for the first time this month. To find original reviews of previously tested notebooks on this month's charts, visit PC World Online (www.pcworld.com/t20pcs).

POWER NOTEBOOKS

3 DELL LATITUDE CPI D266XT

PRO: Great design, stable platform

CON: Below-average battery life

Let's get straight to the point: The Dell Latitude Cpi D266XT is one of the best-designed notebooks we've seen. Only its price keeps it from topping the chart.

We were impressed with the $3799 Latitude as soon as we saw it. The front of the charcoal-gray notebook has swept curves instead of the flat bulldog face found on most notebooks. At 1.5 inches top to bottom, it's also a tad thinner than the standard fare.

Lifting the screen reveals a spacious, unusually functional keyboard containing tall, normal-size keys that are much easier to use than those on other notebooks. The Latitude's key action feels pleasantly crisp, despite just a little side-to-side wiggling. We also found the touchpad responsive and accurate. But unlike older models, this Latitude doesn't come with a trackball.

Fire up the notebook and you see a sharp 13.3-inch active-matrix screen. The side placement of the notebook's speakers produces better-than-usual sound, with a remarkable amount of stereo separation. Other nice touches include a Yamaha wavetable synthesizer for enhanced MIDI file playback and a 4GB hard drive set in shock-absorbing mounts.

The Latitude's Pentium II-266 processor, backed by 64MB of SDRAM, makes it among the fastest notebooks we've seen. But like all the other PII notebooks we've

		EXPANDABILITY					CUSTOMER SUPPORT			
CD-ROM drive speed	Modem speed (kbps)	Maximum RAM (MB)	Modular expansion bays	Bay for second battery	Optional docking station	Infrared port	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
12X-24X	56[2]	144	1	●	○	●	varies[3]/1	24	Sat., Sun.	BBS, WWW
12X-24X	not included	144	1	●	○	●	1/1	24	Sat., Sun.	BBS, WWW
12X-20X	not included	128	1	●	●	●	3/1	24	Sat., Sun.	BBS, WWW
not included	not included	96	1	●	●	●	3/3	24	Sat., Sun.	AOL, BBS, CIS, WWW
12X-20X	56[4]	144	1	○	●	●	1/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
8X-20X	not included	192	1	○	●	●	1/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
8X-20X	33.6	128	0	○	○	●	1/1	24	Sat., Sun.	BBS, CIS, WWW
12X-20X	56[2]	128	0	○	○	●	1/1	13	Sat.	BBS, WWW
12X-24X	56[2]	144	2	●	●	●	varies[3]/1	24	Sat., Sun.	BBS, WWW
12X-20X	33.6	144	2	○	○	●	2/2	9	none	BBS, WWW

[3] Three years on CPU and main RAM, one year on other parts. [4] Downloads only, uploads at 33.6-kbps; uses 3Com/U.S. Robotics' x2 technology.

tested, the Latitude draws an excessive amount of battery power—battery life is just 3.75 hours. But for $169 you can buy a second battery, put it in the modular bay, and run two power packs at once.

IS managers fed up with the short shelf life of most notebooks should know that Dell promises not to significantly change its Latitude CP line until fall 1999. Dell's usual classy online and hard-copy documentation is included. If you need a human hand, the vendor's technical support is open around the clock. We found the tech staff's advice to be adequate and timely in our anonymous calls.

Quality, of course, doesn't come cheap: The Latitude costs several hundred dollars more than similarly configured notebooks. But sometimes it's worth it.

DTK FortisPro Top5A233

BUDGET NOTEBOOKS

5 DTK FORTISPRO TOP5A233

PRO: Great price for an MMX-233

CON: Slightly heavy, poor battery life

"Power to the people" could be the slogan of the DTK FortisPro Top5A233 notebook.

The power comes from a Pentium MMX-233, a processor plenty fast for most tasks. Supported by 32MB of RAM, the DTK FortisPro is among the fastest notebooks in its class. At $2090, it is also the least-expensive PMMX-233 we've seen—several hundred dollars cheaper than similarly configured notebooks.

The good-looking FortisPro is solidly constructed, with spacious wrist rests for those of us with large hands. The keyboard offers crisp action, but the layout is too cramped and many keys are undersized, making it hard to do accurate touch-typing. Below the nicely tuned touchpad are flush-mounted buttons that seem a little stiff and are hard to locate by feel alone.

The notebook has all the basic features you'll need: a sharp 12.1-inch active-matrix screen, a 3GB hard drive, 12X–20X CD-ROM that time-shares a modular bay with the floppy drive, and a 33.6-kbps PC Card modem. DTX also includes a MIDI/joystick port for gaming, a feature found more often on high-end notebooks.

Unfortunately, traveling is not the FortisPro's forte. At 8 pounds, the notebook is on the heavy side and will weigh you down on treks through the airport. And after only 3.3 hours of battery power, the unit becomes an oversize paperweight. That leaves you plenty of time to take a long nap on a cross-country flight.

We don't have any data for gauging the reliability of the DTK, since the FortisPro is the PC vendor's first notebook. But the company does provide a two-year parts-and-labor warranty, which outdistances the typical one-year offering.

Telephone technical support is limited to 9 hours daily and nothing on weekends. In our anonymous calls, the techs were prompt, but they gave poor advice in response to two of our three questions. If you're the self-reliant type, the FortisPro's well-prepared written documentation might help solve your problems. ■

BEYOND THE TOP 10

We evaluated these systems along with the others, but they didn't score high enough to reach the Top 10 Notebook PCs chart. For more information on these systems, visit PC World Online (www.pcworld.com/t20pcs).

- Acer TravelMate 7164TE
- Compaq Armada 7800
- Eurocom 8500M
- Hitachi VisionBook Plus 5260
- HP OmniBook 4100
- IBM ThinkPad 310ED
- IBM ThinkPad 770E
- Micro Express NP8266B
- Toshiba Satellite 305CDS

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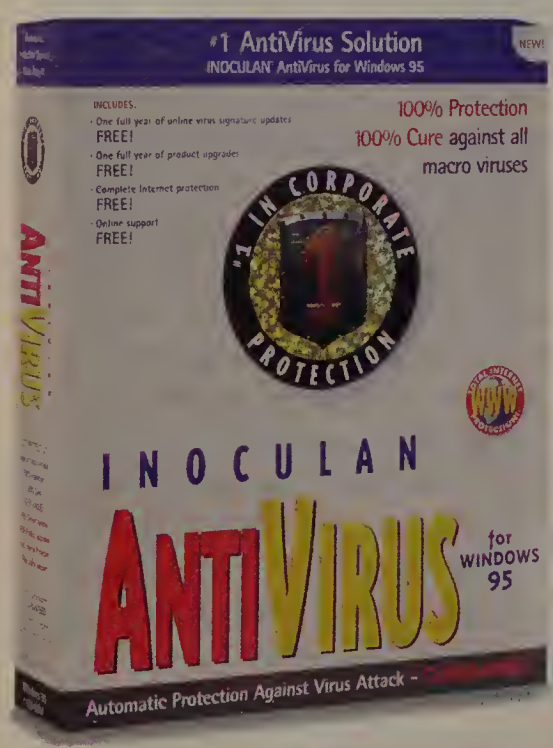

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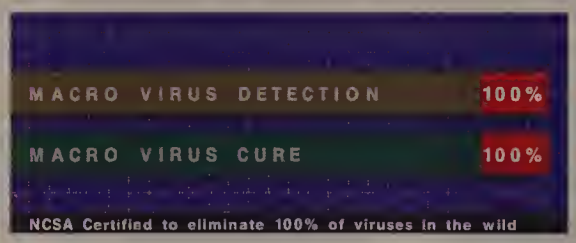

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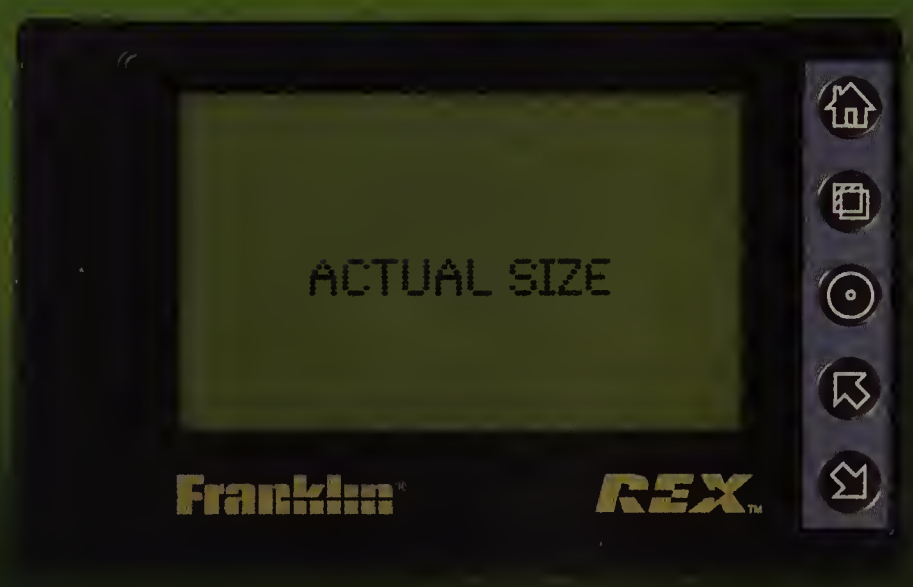

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PC WORLD

TOP 10 HOME PCs

	POWER SYSTEM	Last month	Month tested	Street price (4/10/98)	Comments
1	Micron Millennia XKU 266 888/634-8799 www.micronpc.com	1	May 98	$2249	PRO: Good performance for a reasonable price, first-rate reliability and service ratings. CON: None of the bundled applications are preinstalled.
2	Micron Millennia XKU 300 888/634-8799 www.micronpc.com	2	May 98	$2723	PRO: Superfast machine, killer sound system, top-notch reliability and service ratings. CON: Most expensive system on power chart.
3	Gateway G6-300h 800/846-2000 www.gateway.com	n/a	NEW	$1999	PRO: Very fast, cheapest system on power list, good selection of home-oriented software titles. CON: Software documentation is on skimpy side.
4	Dell Dimension XPS D300 800/388-8542 www.dell.com	3	May 98	$2499	PRO: Impressive hardware package, good performance, first-class reliability and service ratings. CON: On the pricey side, sparse software package, setup instructions are not comprehensive.
5	IBM Aptiva E76 800/426-7235 www.ibm.com/aptiva	n/a	NEW	$2148	PRO: Very low price for a power system, racehorse speed. CON: 15-inch monitor, limited software bundle, no AGP.
	BUDGET SYSTEM				
1	Gateway G5-233 800/846-2000 www.gateway.com	2	May 98	$1499	PRO: Great price for top starter package including color printer and home-oriented software titles. CON: Lacks power for demanding apps, some software documentation is inadequate.
2	Gateway G6-266h 800/846-2000 www.gateway.com	n/a	NEW	$1799	PRO: Fastest budget system ever, setup is a cinch, great software bundle, 17-inch monitor. CON: Most expensive budget PC on chart, software documentation not consistently detailed.
3	HP Pavilion 3260 800/724-6631 www.hp.com	5	May 98	$1198	PRO: Cheapest system in our Top 10, great for first-time PC owners. CON: No secondary cache and minimal video RAM make it slowest system on chart.
4	IBM Aptiva E26 800/426-7235 www.ibm.com/aptiva	4	May 98	$1348	PRO: Good tutorial programs, nice interface, setup is a snap. CON: Slow performance, underpowered for running video-intensive software.
5	Quantex QP6/266 M-1x 800/896-4898 www.quantex.com	n/a	NEW	$1498	PRO: Good price for second-fastest PC on budget chart, 17-inch monitor. CON: Range of software titles is unimpressive.

Best Buy

GET READY: OVER THE NEXT FEW months, PC makers will be rolling out machines sporting Intel's new chips—the Pentium II-350, Pentium II-400, and the low-cost Celeron. As manufacturers and retailers clear inventories to make room for these newer models, you're bound to find some super bargains. We're also seeing a fresh wave of home PCs: Four brand-new units arrived this month—two budget and two power—and all four cracked the Top 10.

But note that some systems carried over from the May issue, like Gateway's G5-233 and Micron's Millennia XKU 300, won't be available much longer. So keep your eyes open for some great deals.

POWER SYSTEMS

AT THE TOP OF THE heap for the third month in a row are two very fast systems from Micron. Our Best Buy is the Millennia XKU 266, a great choice for the home office. Though it's the second-slowest system in our power Top 5, it's still got the muscle you need for making presentations, working with graphics, or manipulating large spreadsheets. It comes with Microsoft Office 97 Small Business Edition, a built-in Zip drive, and a 17-inch monitor. And the $2249 price tag is easy on the budget of a growing business.

If your idea of a home machine involves fast and furious fun, then Micron's Millennia XKU 300 is what you're looking for. Our number two power system costs a hefty $2723, but that's fair for what you're buying: powerhouse performance—the XKU 300 ties with IBM's Aptiva E76 as this month's fastest Top 5 machine—and loads of gaming goodies. You get a Microsoft SideWinder joystick, a ThrustMaster game pad, and a set of terrific MicroWorks speakers from Cambridge Soundworks. A 17-inch monitor, good for viewing DVD titles like the bundled game Silent Steel, is also included.

Gateway G6-300h

New at number three is a great PC for the computer-savvy family on a budget, Gateway's G6-300h. This slimmed-down version of the G6-300h that made our chart for the last two months has less memory (32MB instead of 64MB), a less roomy hard drive (4GB, not 8GB), and a smaller monitor (now 17 inches) than its predecessor, but Gateway also trimmed over $800 from the price. At $1999, it's a real bargain, especially with the bundled software: Microsoft Home Essentials 98, Publisher 97, and Creative Writer 2.

Slipping one spot to number four is Dell's $2499 Dimension XPS D300. Its superlative reliability and service rankings are matched only by Micron. Dell's 24-month lease option and the XPS D300's ability to comfortably run even big spreadsheets and databases make it a good

SCORECARD

★ Overall rating	PC WorldBench 98 score/rating	Price	Reliability/ support	Setup	Features	Reader service number
80	151/outstanding	average	above average/ above average	good	Pentium II-266, 32MB of SDRAM, 6.4GB hard disk, 13X-32X CD-ROM drive, 56-kbps fax-modem, Iomega Zip drive, 17-inch monitor, AGP graphics card.	643
79	165/outstanding	very expensive	above average/ above average	good	Pentium II-300, 64MB of SDRAM, 6.4GB hard disk, 13X-32X CD-ROM drive, 56-kbps fax-modem, Iomega Zip drive, 17-inch monitor, AGP graphics card.	644
79	159/outstanding	very inexpensive	average/ above average	good	Pentium II-300, 32MB of SDRAM, 4.3GB hard disk, 2X DVD-ROM drive, 56-kbps fax-modem, 17-inch monitor, AGP graphics card.	645
79	150/outstanding	expensive	above average/ above average	fair	Pentium II-300, 32MB of SDRAM, 6.4GB hard disk, 2X DVD-ROM drive, Cinemaster II MPEG decoder card, 56-kbps fax-modem, 17-inch monitor, AGP graphics card.	646
77	165/outstanding	very inexpensive	average/ average	good	Pentium II-300, 64MB of RAM, 8GB hard drive, 12X-24X CD-ROM drive, 56-kbps fax-modem, 15-inch monitor.	–
Power scorecard weightings ▶	Performance 30 percent	Price 15 percent	R/S 40 percent	Setup 5 percent	Features 10 percent	
83	81/fair	inexpensive	average/ above average	outstanding	Pentium MMX-233, 16MB of SDRAM, 2GB hard disk, 13X-32X CD-ROM drive, 56-kbps fax-modem, 15-inch monitor, Canon BJC-4300 color bubble jet printer.	647
82	147/outstanding	expensive	average/ above average	outstanding	Pentium II-266, 32MB of SDRAM, 4.2GB hard drive, 13X-32X CD-ROM drive, 56-kbps modem, 17-inch monitor, AGP graphics card.	648
81	77/fair	very inexpensive	average/ average	outstanding	Pentium MMX-200, 32MB of SDRAM, 2GB hard drive, BX-16X CD-ROM drive, 56-kbps modem, 15-inch monitor.	649
81	97/fair	inexpensive	average/ average	outstanding	AMD K6-233 MMX, 32M8 of SDRAM, 3GB hard drive, 12X-24X CD-ROM drive, 56-kbps modem, 15-inch monitor.	–
81	141/outstanding	inexpensive	average/ average	fair	Pentium II-266, 32MB of SDRAM, 3.2GB hard drive, 12X-32X CD-ROM drive, 56-kbps modem, 17-inch monitor, AGP graphics card.	650
Budget scorecard weightings ▶	Performance 15 percent	Price 30 percent	R/S 40 percent	Setup 5 percent	Features 10 percent	All products: 904

choice for the small-business owner or self-employed person strapped for cash up front. Software is a little thin, though—you choose between Microsoft Office 97 SBE and Microsoft Home Essentials.

Rounding out the power list is IBM's Aptiva E76. With color-coded cables and excellent documentation, the system is a breeze to set up. The $2148 E76 is also lightning-fast—tying with Micron's Millennia XKU 300 as the best performer this month. However, you won't find tons of software—just Lotus SmartSuite 97 and some proprietary antivirus programs.

BUDGET SYSTEMS

CLIMBING INTO this month's budget Best Buy spot is Gateway's G5-233. This Pentium MMX-233–based machine is a great value for the first-time buyer or the family that isn't yearning to play the wickedest games. The $1499 G5-233 can handle family-focused tasks like kids' homework, preparing taxes, and e-mailing friends and relatives—plus it comes with a Canon BJC-4300 color bubble jet printer. The G5-233 is also ideal for small home-office tasks, but a little slow if you need to print hundreds of color brochures. You get a great software bundle including Microsoft Encarta 98 and Home Essentials 98.

In the second spot is a newcomer from Gateway, the G6-266h. This budget system has powerful aspirations—it's almost as fast as Dell's Dimension XPS D300 on our power chart, yet is a full $700 cheaper. The software bundle is limited—it does include Quicken Basic 98 and Redline Racer—but a 17-inch monitor, 4GB hard drive, and 4MB of video memory sweeten the deal. At $1799 it's our most expensive budget system, but if you need low-cost computing power, you can't beat it.

Moving up two notches to number three is Hewlett-Packard's Pavilion 3260. This Pentium MMX-200 machine is no speed demon—it's the slowest on the chart—but it still has plenty of power for basic household activities. A low price ($1198 with a 15-inch monitor) and easy setup make this HP the computer for beginners on a budget.

Somewhere between the fast Pentium II PCs and the slower Pentium MMX models is IBM's Aptiva E26. At number four, the AMD K6–based machine has plenty of power to take care of family finances and home-office business. Only serious gamers may be dissatisfied. Like its E76 sibling, the $1348 E26 comes with the bare minimum of bundled software.

If your need is speed and Gateway's G6-266h is just too pricey, take a look at the QP6/266 M-1x from Quantex—our second fastest budget machine. This month's number five budget system is configured much like the Gateway PC: a Pentium II-266 CPU, 32MB of RAM, a 3.2GB hard drive, and a 17-inch monitor. But at $1498, it costs about $300 less. Software includes Corel's WordPerfect Suite 8, Microsoft Bookshelf, and Body Works 6.0.

Quantex QP6/266 M-1x

—*Kirk Steers*

Kirk Steers is a contributing editor for PC World. *Testing performed by Ulrike Diehlmann of the PC World Test Center.* ■

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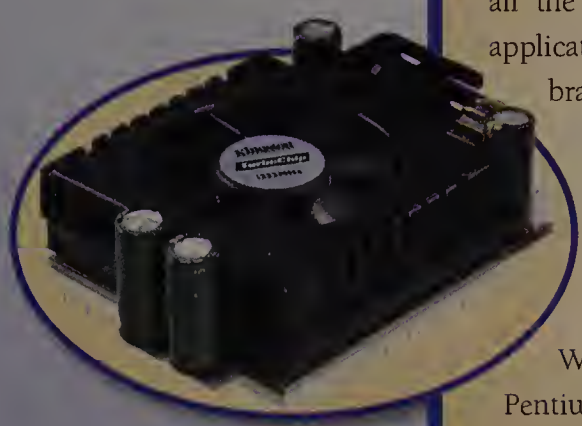

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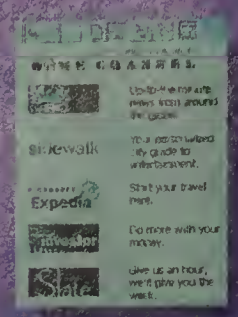

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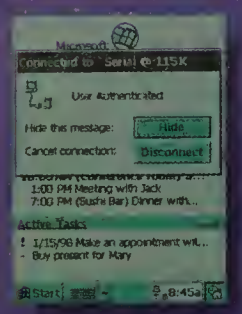

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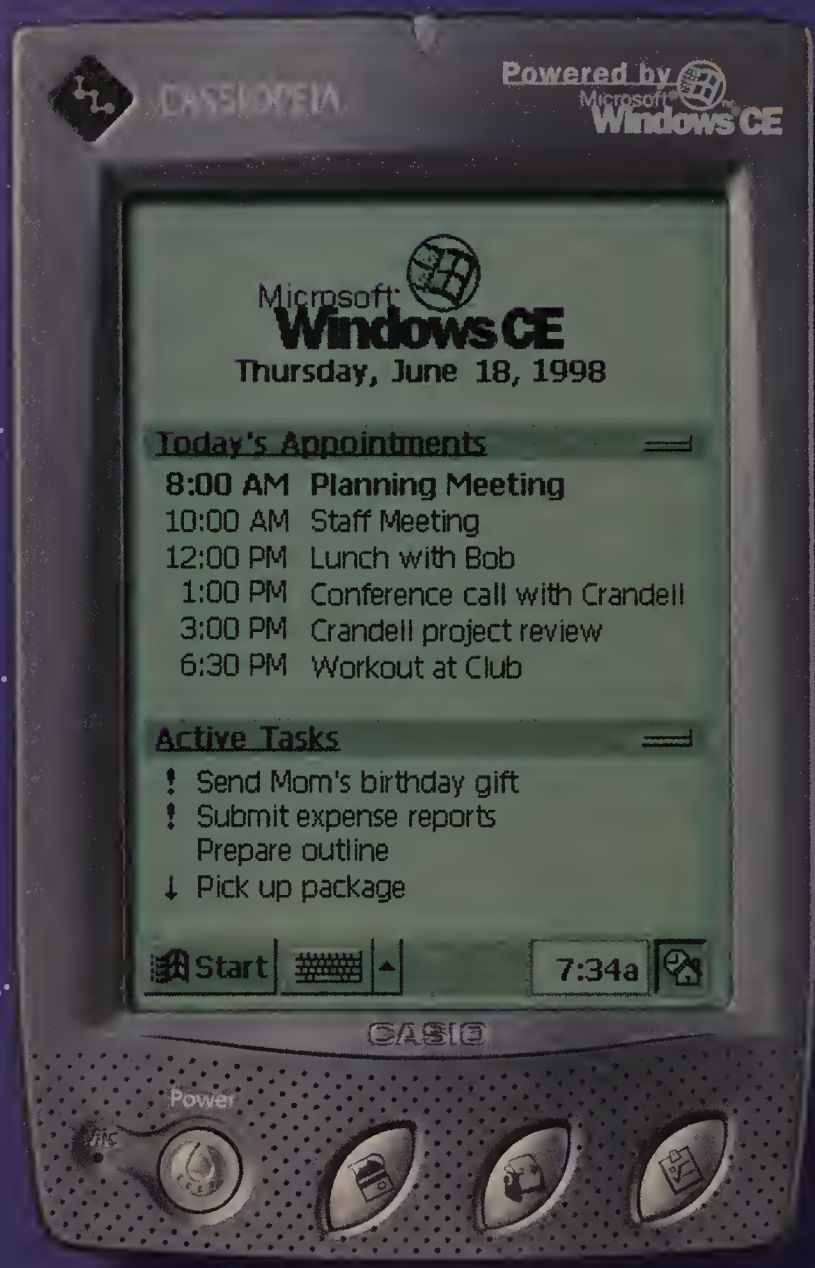

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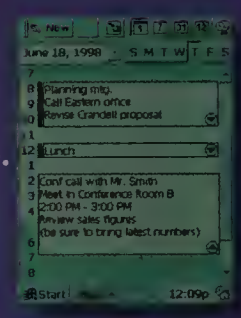

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PC WORLD

TOP 10 PRINTERS

	MONOCHROME WORKGROUP PRINTER	Month tested	Street price (4/2/97)	Overall rating	Speed for plain text (ppm)	Speed for full-page graphics (ppm)	Comments	Reader service number
1	HP LaserJet 4000 TN 800/752-0900 www.hp.com	Jan 98	$1599	95	12.8	3	**FEATURES:** 17-ppm laser. Standard 8MB of RAM, 1200-by-600-dpi resolution, 600 sheets input, 300 output. **PRO:** Fastest text speed, great text quality, large paper capacity. **CON:** Mediocre graphics at default settings, most expensive on monochrome chart (though base model is $1099).	662
2	HP LaserJet 5000 800/752-0900 www.hp.com	NEW	$1449	94	11.9	3.1	**FEATURES:** 16-ppm laser. Standard 4MB of RAM, 1200-by-1200-dpi resolution, 350 sheets input, 300 output. **PRO:** Fast, prints documents up to 11 by 17 inches, good text quality, great documentation. **CON:** Mediocre graphics at default settings, fairly low paper capacity for its class.	663
3	Xerox DocuPrint P12 800/832-6979 www.xerox.com	NEW	$699	93	9.1	2.1	**FEATURES:** 12-ppm laser. Standard 2MB of RAM, 600-by-600-dpi resolution, 330 sheets input, 250 output. **PRO:** Inexpensive, best text quality we've seen, three-year warranty, good software bundle. **CON:** Not much faster than the cheaper NEC SuperScript 1260.	664
4	Brother HL-1660 908/704-1700 www.brother.com	Mar 98	$1299	84	11.4	2.4	**FEATURES:** 17-ppm-laser. Standard 4MB of RAM, 600-by-600-dpi resolution, 650 sheets input, 250 output. **PRO:** Fast, good text quality, nice paper-handling options, fewer jams with heavy paper stock than most printers. **CON:** Muddy graphics, most of manual comes only on CD-ROM, control panel can be confusing.	665
5	NEC SuperScript 1260 800/632-4636 www.nec.com	Sept 97	$599	82	8.8	2	**FEATURES:** 12-ppm laser. Standard 2MB of RAM, 600-by-600-dpi resolution, 330 sheets input, 250 output. **PRO:** Least expensive on chart, good graphics printing, 1260N model includes ethernet and costs $979. **CON:** Somewhat jagged text, slowest printer on monochrome chart.	666
	COLOR WORKGROUP PRINTER							
1	Epson Stylus Color 1520 800/463-7766 www.epson.com	Sept 97	$799	86	3.2	0.9	**FEATURES:** 6-ppm monochrome/5-ppm color ink jet. Standard 64KB of RAM, 1440-by-720-dpi monochrome/color resolutions, 100 sheets input, 35 output. **PRO:** Extremely inexpensive, gorgeous color quality. **CON:** Very slow text speed, meager paper capacity, needs special stock for best print quality.	–
2	Minolta Color PageWorks PS 888/264-6658 www.minoltaprinters.com	May 98	$3299	85	8.4	0.5	**FEATURES:** 12-ppm monochrome/3-ppm color laser. Standard 20MB of RAM, 600-by-600-dpi maximum resolution, 400 sheets input, 250 output. **PRO:** Automatic switching between print languages, 20 percent faster than non-PS version, good paper-handling features. **CON:** Gray-scale images are a bit coarse.	667
3	Xerox DocuPrint C55mp Color Laser Printer 800/349-3769 www.xerox.com	Sept 97	$4000	85	8.1	0.5	**FEATURES:** 12-ppm monochrome/3-ppm color laser. Standard 30MB of RAM, 600-by-600-dpi monochrome/color resolutions, 250 sheets input, 150 output. **PRO:** Great print quality, fast color text speed, includes $500 ethernet card and PostScript. **CON:** Power switch is inconveniently located.	668
4	Lexmark Optra SC 1275 800/539-6275 www.lexmark.com	Jan 98	$2999	85	7.4	1	**FEATURES:** 12-ppm monochrome/3-ppm color laser. Standard 16MB of RAM, 600-by-600-dpi monochrome/color resolutions, 400 sheets input, 250 output. **PRO:** $1000 price drop, fastest graphics speed on color chart, good text quality. **CON:** Blocky graphics and garish colors, complicated printer software.	669
5	Tektronix Phaser 560 800/835-6100 www.tek.com/color_printers	Jan 98	$3995	82	6.5	0.5	**FEATURES:** 14-ppm monochrome/4-ppm color laser. Standard 8MB of RAM, 600-by-600-dpi monochrome/color resolutions, 250 sheets input, 500 output. **PRO:** Great print quality, can print labels and envelopes in color. **CON:** Replacing fuser and drum is awkward.	670

Best Buy — Windows 95-certified Plug and Play — All products: 906

TEST PC WORLD CENTER

HOW WE TEST The overall rating for both monochrome and color workgroup printers is based on print quality (27 percent), price (20 percent), features and ease of use (20 percent), speed (15 percent), service and support (13 percent), and consumables (5 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

NEED A MONOCHROME PRINTER for your department or small company? Now's a great time to buy one: Several top companies are revamping their monochrome lines, replacing old models with faster or fancier new ones. Hewlett-Packard, for example, fills out its midrange, 16- to 17-page-per-minute line with the $1449 LaserJet 5000, which quickly prints documents up to 11 by 17 inches. It jumps onto our chart at number ▶

two. Xerox aims its $699 DocuPrint P12 at smaller offices that require less speed and paper capacity. Great print quality and a low price land it in third place.

Meanwhile, Lexmark is replacing its Optra S 1620 and Optra S 1650—second and third place on our May monochrome chart—with faster, similarly priced new models. We'll test the new units when they ship next month. Lexmark's Optra SC 1275, still our number four color workgroup printer, now costs $1000 less. This steep price drop to under $3000 almost moves it up the chart, but the top three still beat it on print quality and ease of use.

We were disappointed by Brother's new 16-ppm color laser, the HL-2400C. Now that many color lasers sell for around $3000 while offering better quality and performance, the Brother's $3500 price tag seems expensive. Our number two, the Minolta Color PageWorks PS, produces superior color at similar speeds, and cleaner text at almost 10 percent faster speed—for $200 less.

RHAPSODY IN BLACK AND WHITE

OUR TWO NEW chart makers, the HP LaserJet 5000 and the Xerox DocuPrint P12, offer more features for less money than you'd expect. The LaserJet 5000's ability to print 11-by-17-inch pages is rare among workgroup printers and usually raises the cost to over $2000. At $1449 the 5000 is within reach of most spreadsheet-centric companies. (If you don't need wide-format printing, the HP LaserJet 4000 TN, our Best Buy since January, is still a better value.)

The 5000 is also speedy. It churns out text at almost 12 ppm (second fastest on our chart) and graphics at over 3 ppm (the fastest). Its print quality is similar to the 4000 TN: light but precise text, and graphics that depend on the setting (gradations look rough at the default setting but smooth at the special setting).

The LaserJet 5000's other strengths (many of which the 4000 TN shares) include one of the best manuals HP has published; intuitive control panel menus; a straight path for heavy stock; easy-to-reach internals for clearing jams or replacing components; and a 3-second warm-up time. Our single complaint is that the base model includes only a 250-sheet input paper tray, though the standard 100-sheet multipurpose tray (also good for transparencies and envelopes) helps.

The 5000 comes in two versions besides the $1449 model we tested: The $2059 5000N includes 500- and 250-sheet trays and a network interface, while the $2599 5000GN adds a 1GB hard disk for added font storage. A $399 add-on device that lets you print on both sides of a page works with all three models.

Xerox's DocuPrint P12, though not as fast as the LaserJet 5000, is equally impressive, boasting extraordinary print quality and support. Xerox provides a three-year on-site service warranty while other companies offer just one or two years of support without on-site service.

THE XEROX DOCUPRINT P12 offers small workgroups great monochrome print quality for a low price of $699.

Compared to the fifth-ranked NEC SuperScript 1260, another 12-ppm printer, the P12 costs $100 more and isn't much faster: 9.1 ppm on text and 2.1 ppm on graphics (versus NEC's 8.8 ppm on text and 2 ppm on graphics). But the P12's print quality is markedly superior to the NEC's. In fact, its text quality is the best of any printer we've tested, and its graphics are detailed and realistic. Also, whereas few printer vendors bundle software with their monochrome models, the P12 includes Brøderbund's ClickArt, Lotus Organizer 97, and McAfee's VirusScan.

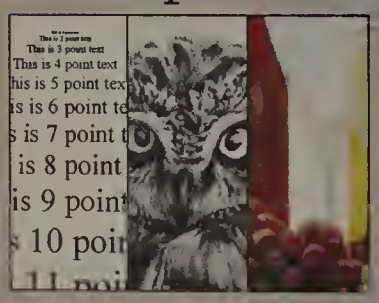
SWIMMING IN COLOR

BROTHER'S HL-2400C is a perfectly adequate printer, but the color laser market is overflowing with better printers for about the same price. The HL-2400C is slow for a 16-ppm printer: Two 12-ppm models, the Minolta Color PageWorks PS and the Xerox DocuPrint C55mp, beat its 7.7-ppm text speed and rival its 0.6 ppm graphics speed. The Brother's print quality also isn't top-notch: Everything comes out much too dark, so text looks overbearing and color images seem muddy. (It does a good job on gray-scale graphics, though.) Further weighing down the HL-2400C are its Byzantine control panel menus, flaky installation (it asked for the Windows 95 CD-ROM in the middle of installation), lack of an auxiliary tray, and the $550 extra for a legal-size paper tray.

—*Dan Littman* ■

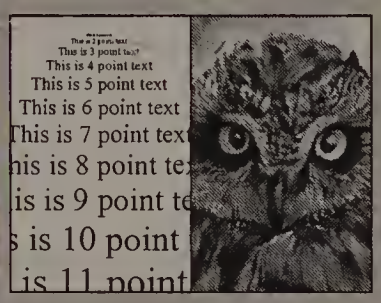
PRINT QUALITY SAMPLES

Superior Text With New Xerox Printer



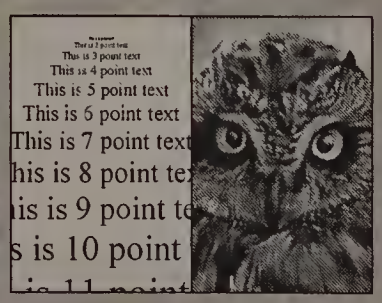
EPSON STYLUS COLOR 1520

Our Best Buy since September, the 1520 offers rich color and fine text for just $799. Like most ink jets, however, it needs special paper for its best prints.



HP LASERJET 5000

Like our Best Buy, the 4000 TN, the 5000 produces readable text and good graphics at special settings. At its default setting (above), grays lack range.



XEROX DOCUPRINT P12

The best overall text quality we've seen, coupled with detailed and realistic gray-scale graphics, helps put the new P12 at number three on our monochrome chart.

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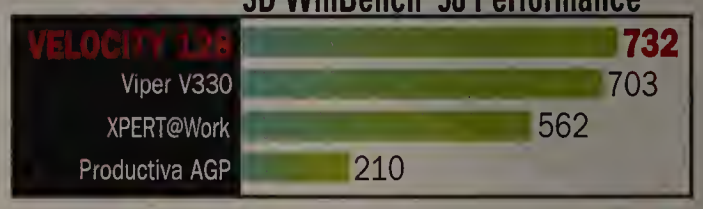

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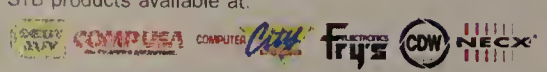

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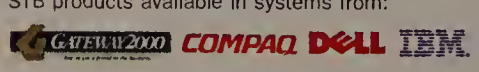

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Circle 200 on reader service card

PC WORLD

TOP 10 MONITORS

	17-INCH MONITOR	Month tested	Street price (4/10/98)	Overall rating	Quality of text/graphics	Comments	Reader service number
1	Iiyama VisionMaster Pro 17 800/394-4335 www.iiyama.com	Sept 97	$579	89	very good/ excellent	**FEATURES:** 15.9-inch viewable area, .25mm stripe pitch Diamondtron tube, up to 85-Hz refresh rate,[1] Plug and Play ready,[2] three-year warranty, 12-hour weekday toll-free support. **PRO:** $60 price drop, great graphics, superb text, easy-to-adjust on-screen menus, large viewable area. **CON:** Two faint lines visible across screen.	601
2	Mitsubishi Diamond Pro 87TXM 800/843-2515 www.mitsubishi-display.com	Sept 97	$549	88	very good/ very good	**FEATURES:** 15.7-inch viewable area, .25mm stripe pitch Diamondtron tube, up to 107-Hz refresh rate,[1] Plug and Play ready,[2] TCO'95 compliant, three-year warranty, 12-hour weekday toll-free support. **PRO:** $26 price cut, sharp text and colors, great controls, color-correction utility. **CON:** Two faint lines visible across screen.	602
3	ViewSonic PT775 800/888-8583 www.viewsonic.com	Sept 97	$729	87	very good/ excellent	**FEATURES:** 15.9-inch viewable area, .25mm stripe pitch Diamondtron tube, up to 119-Hz refresh rate,[1] Plug and Play ready,[2] TCO'92 compliant, three-year warranty, 11-hour weekday toll-free support. **PRO:** Terrific text, stunning graphics, large viewable area, easy to adjust. **CON:** Highest price on chart, two faint lines across screen.	603
4	TeleVideo SVP270 800/835-3228 www.televideoinc.com	May 98	$479	86	very good/ excellent	**FEATURES:** 15.4-inch viewable area, .25mm stripe pitch Diamondtron tube, up to 119-Hz refresh rate,[1] Plug and Play ready,[2] TCO'95 compliant, three-year warranty, 10.5-hour weekday toll-free support. **PRO:** $171 price cut, fantastic graphics, very adjustable. **CON:** Two faint lines visible across screen, small viewable area.	604
5	Samsung SyncMaster 700b 800/933-4110 www.sosimple.com	Sept 97	$459	85	very good/ very good	**FEATURES:** 15.7-inch viewable area, .28mm dot pitch tube, up to 100-Hz refresh rate,[1] Plug and Play ready,[2] three-year warranty, 24-hour toll-free support. **PRO:** Lowest price on chart, attractively styled, equally fine display of text and graphics, basic controls are easy to adjust. **CON:** Cryptic menu icons.	605
6	Samsung SyncMaster 700p 800/933-4110 www.sosimple.com	Jan 98	$589	85	very good/ very good	**FEATURES:** 15.3-inch viewable area, .26mm dot pitch tube, up to 105-Hz refresh rate,[1] Plug and Play ready,[2] TCO'95 compliant, three-year warranty, 24-hour toll-free support. **PRO:** Sharp styling, well-focused picture, easily adjustable. **CON:** Above-average price, smallest viewable area on chart, cryptic menu icons.	606
7	Panasonic PanaFlat PF70 800/742-8086 www.panasonic.com/alive	Jan 98	$679	85	very good/ excellent	**FEATURES:** 15.6-inch viewable area, .24mm slot pitch tube, up to 106-Hz refresh rate,[1] Plug and Play ready,[2] TCO'92 compliant, three-year warranty, 24-hour toll-free support. **PRO:** $70 price cut, impeccable focus, stunning graphics, flat screen reduces reflections. **CON:** Initial impression of bowed lines, fairly expensive.	607
8	Dell UltraScan 1000HS 800/289-3355 www.dell.com	NEW	$629	85	very good/ excellent	**FEATURES:** 15.7-inch viewable area, .25mm stripe pitch Trinitron tube, up to 105-Hz refresh rate,[1] Plug and Play ready,[2] TCO'95 compliant, one-year warranty, 24-hour toll-free support. **PRO:** Vibrant, colors, crisp text, advanced controls. **CON:** Short warranty (unless purchased with Dell system), relatively expensive.	608
9	AcerView 79g 800/733-2237 www.acer.com	Mar 98	$599	85	very good/ excellent	**FEATURES:** 15.5-inch viewable area, .25mm stripe pitch Diamondtron tube, up to 110-Hz refresh rate,[1] Plug and Play ready,[2] TCO'95 compliant, three-year warranty, 24-hour toll-free support (automated after 5 p.m.). **PRO:** $100 price cut, realistic graphics, sharp text. **CON:** Only one year of toll-free support, above-average price.	609
10	Compaq V75 800/345-1518 www.compaq.com	May 98	$529	83	very good/ very good	**FEATURES:** 15.7-inch viewable area, .26mm dot pitch tube, up to 85-Hz refresh rate,[1] Plug and Play ready,[2] TCO'95 compliant, three-year warranty, 24-hour toll-free support. **PRO:** Fine picture, a year of on-site service, easy basic adjustments. **CON:** No numeric calibrations for gauges, must press Save button to store changes.	610

Best Buy For expanded reviews, visit www.pcworld.com/t10monitors. All products: 901

TEST PC WORLD CENTER

HOW WE TEST Ten judges rate a monitor's text and graphics quality. We evaluate each unit on how well it displays typical business letters, a newsletter, spreadsheets, Web pages, and scanned images. The overall rating is based on text and graphics (25 percent each), features and ease of use (25 percent), price (20 percent), and service and support (5 percent). The best possible overall rating is 100. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

[1] Highest refresh rate at 1024 by 768 resolution. [2] Plug and Play monitors and graphics cards can communicate bidirectionally. However, Windows 95 does not fully utilize monitor Plug and Play.

OUR BEST BUYS trade places this month. Shedding $60, Iiyama's VisionMaster Pro 17 hops up to numero uno. With a more modest $26 price cut, Mitsubishi's Diamond Pro slips to second. A great $171 price cut vaults TeleVideo's SVP270 from tenth to fourth place. Of the eight new monitors we tested, only Dell's UltraScan grabs a spot, at number eight; a higher-than-average price and a short warranty keep it from ranking higher. ■

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Circle 170 on reader service card

PC WORLD

TOP 10 GRAPHICS BOARDS

	PCI GRAPHICS BOARD	Month tested	Street price (4/17/98)	Overall rating	PC WorldBench graphics score/ rating	3D rating	Multimedia rating	Comments	Reader service number
1	ATI 3D Pro Turbo PC2TV 905/882-2600 www.atitech.com	Oct 97	$219	96	189/ very good	good	outstanding	**FEATURES:** 8MB of SGRAM, 200-MHz RAMDAC, ATI Rage II chip, software for 3D modeling, image editing, and VRML. **PRO:** Terrific multimedia performance, nice 3D, connects to a TV. **CON:** Expensive, mediocre video playback, no toll-free support.	652
2	ATI Xpert@Work 905/882-2600 www.atitech.com	Dec 97	$139	95	191/ outstanding	good	good	**FEATURES:** 4MB of SGRAM (upgradable to 8MB), 230-MHz RAMDAC, ATI Rage Pro chip, bundled photo editing and 3D modeling software. **PRO:** Fast all around, great utilities, connects to a TV. **CON:** So-so 3D image quality, no toll-free support.	653
3	Hercules Thriller 3D 800/532-0600 www.hercules.com	Mar 98	$109	94	188/ very good	very good	poor	**FEATURES:** 4MB of SGRAM, 230-MHz RAMDAC, Rendition Verite V2200 chip, no software. **PRO:** $20 price drop, above-average 3D performance, decent 2D performance, toll-free support. **CON:** Slow in AVI video playback, no weekend support.	654
4	STB Velocity 128 800/234-4334 www.stb.com	Nov 97	$129	94	189/ very good	very good	adequate	**FEATURES:** 4MB of SGRAM, 230-MHz RAMDAC, NVidia Riva 128 chip, bundled 3D games and image editing software. **PRO:** $20 price drop, excellent 3D image quality, strong 2D, good selection of game software. **CON:** Poor AVI video playback.	655
5	STB Nitro 3D 800/234-4334 www.stb.com	Dec 97	$99	92	190/ outstanding	adequate	adequate	**FEATURES:** 4MB of EDO DRAM, 170-MHz RAMDAC, S3 Virge/VX chip, bundled 3D games. **PRO:** Inexpensive board with speedy 2D performance, toll-free support, lifetime warranty. **CON:** Below average in 3D image quality.	656
6	ATI 3D Xpression+ PC2TV 905/882-2600 www.atitech.com	Oct 97	$115	92	190/ outstanding	adequate	adequate	**FEATURES:** 4MB of SGRAM, 170-MHz RAMDAC, ATI Rage II chip, bundled 3D games plus 3D modeling, image editing, and VRML software. **PRO:** Good 2D, speedy 3D, nice bargain, connects to a TV. **CON:** Mediocre video playback, no toll-free support.	657
7	Hercules Terminator 3D/DX 800/532-0600 www.hercules.com	Oct 97	$75	91	189/ very good	adequate	very good	**FEATURES:** 4MB of EDO DRAM, 170-MHz RAMDAC, S3 Virge/DX chip, bundled 3D games. **PRO:** $14 price drop, quick in multimedia programs, excellent AVI video playback, toll-free support. **CON:** Subpar 3D quality overall, driver bug in Terracide game.	658
8	Hercules Dynamite 3D/GL 800/532-0600 www.hercules.com	May 98	$139	90	192/ outstanding	good	adequate	**FEATURES:** 4MB of SGRAM, 250-MHz RAMDAC, 3Dlabs Permedia 2 chip, bundled games and image editing software. **PRO:** $20 price drop, good 3D and 2D performance, toll-free support. **CON:** Disorganized utilities, choppy AVI video playback.	659
9	Hercules Stingray 128/3D 800/532-0600 www.hercules.com	Oct 97	$159	90	184/ very good	very good	poor	**FEATURES:** 4MB of EDO DRAM, 180-MHz RAMDAC, Alliance ProMotion-AT3D chip, 3Dfx Voodoo Rush 3D chip set, bundled games. **PRO:** $26 price drop, terrific 3D image quality, toll-free tech support. **CON:** Slowest 2D performance on chart.	660
10	Diamond Viper V330 800/468-5846 www.diamondmm.com	retested this month	$150	90	191/ outstanding	good	adequate	**FEATURES:** 4MB of SGRAM, 230-MHz RAMDAC, NVidia Riva 128 chip, bundled 3D games, photo and image editing software. **PRO:** $20 price drop, good 3D, top-notch 2D. **CON:** Choppy AVI video playback, mixed bag on image quality, no toll-free support.	661

Best Buy For reviews of products that didn't make the chart, visit www.pcworld.com/t10graphics. All products: 905

TEST PC WORLD CENTER **HOW WE TEST** We tested PCI boards under Windows 95 with PC WorldBench 1.0 at 800 by 600 resolution and 16.8 million colors, at 1024 by 768 and 65,536 colors (reported here), and at 1280 by 1024 and 65,536 colors. The 3D score is based on frame rates in our VRML and 3D game tests and on subjective ratings in three games. The multimedia rating is based on frame rates in our Macromedia Director and AVI playback tests, and on timed scores in our PowerPoint multimedia presentation tests. Boards were tested in a Dell Dimension XPS P133c with 32MB of EDO DRAM and 256KB of pipeline-burst secondary cache. The overall rating is based on performance (40 percent), features (30 percent), price (20 percent), and support policies (10 percent). For all scores, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

THIS MONTH we retested the Diamond Viper V330, whose new Turbo driver revs up 3D performance—our test games and VRML images ran faster than ever. But the driver doesn't do anything to improve the Viper's image quality, which is still a mixed bag. With this spotty performance, the Viper sticks in last place on our chart. Expect a lot of changes next month: We're making our tests tougher, and we'll review AGP cards for the first time. ■

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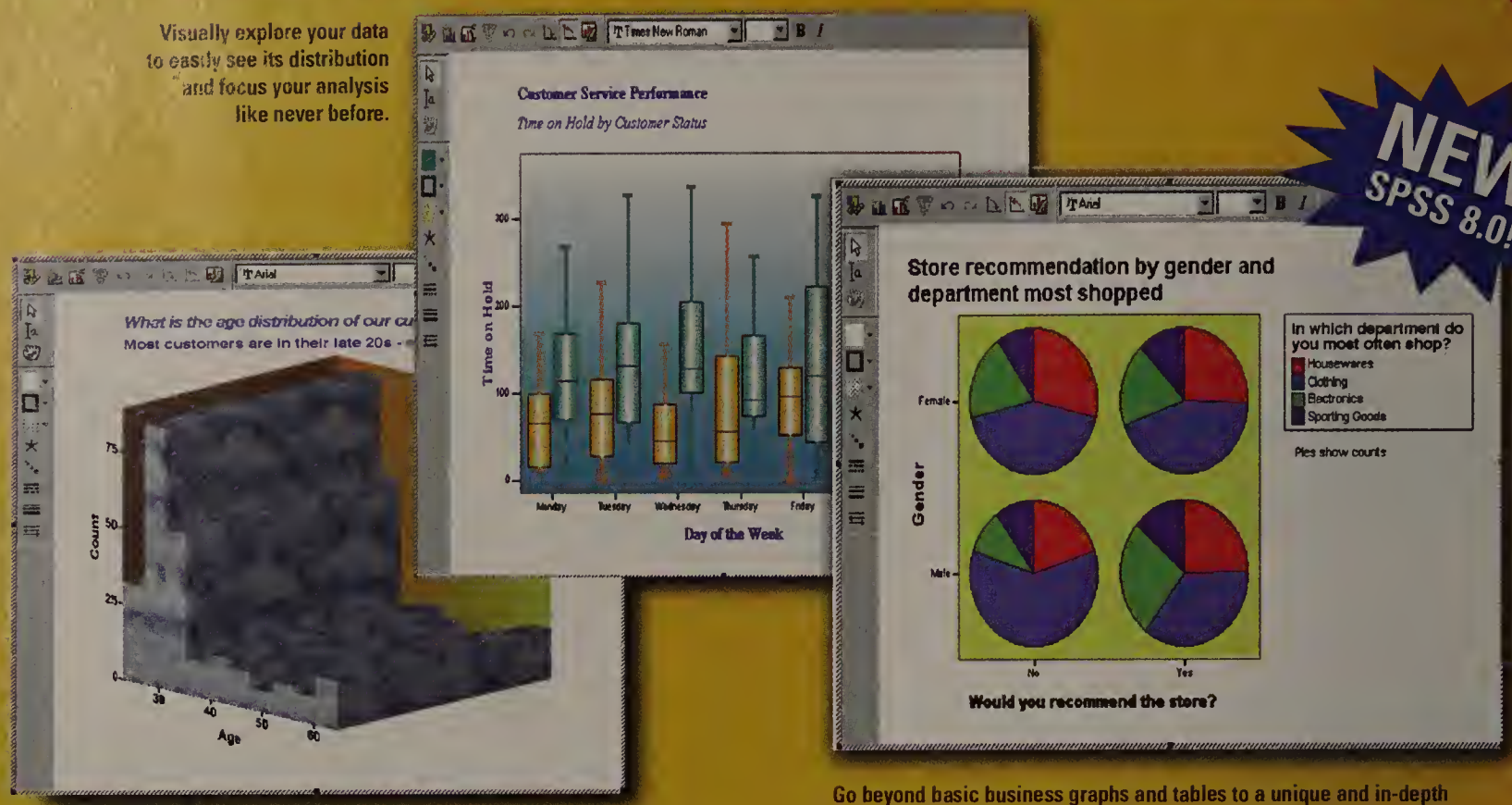

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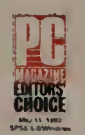

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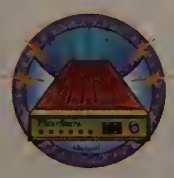
TOP 10 MODEMS

	56-KBPS INTERNAL MODEM	Month tested	Street price (4/21/98)	Overall rating	V.34 transfers/ 56-kbps downloads (min:sec per MB)	Comments	Reader service number
1	IBM 56K Modem Internet Kit 800/772-2227 www.pc.ibm.com/us	Nov 97	$119	81	2:39/3:17	**FEATURES:** Supports x2, 8-bit ISA card, V.80 videoconferencing support, distinctive ring, voice mail, speakerphone, DSVD, Caller ID, QuickLink Message Center software. **PRO:** Rich features, 24-hour support, $16 price cut. **CON:** Slow 56-kbps downloads, free upgrade to V.90 standard only if it can be performed through software.	–
2	Diamond Multimedia SupraExpress 56i 800/468-5846 www.diamondmm.com	retested this month	$100	80	2:41/3:04	**FEATURES:** Supports V.90 and K56flex, 16-bit ISA card, V.80 videoconferencing support, distinctive ring, COMit and FaxTalk software. **PRO:** Easy on your wallet, good 56-kbps performance, long support hours including Saturday. **CON:** Very few extra features, support call is on your dime.	701
3	3Com U.S. Robotics Courier V.Everything 56K Internal 800/638-3266 www.3com.com	Nov 97	$240	79	2:33/2:57	**FEATURES:** Supports x2, 8-bit ISA card, distinctive ring, callback, Caller ID, RapidComm software. **PRO:** Best overall performer, toll-free support, free upgrade to V.90 standard even if modem swap required. **CON:** Even after $20 price drop, still the most expensive modem on chart; no weekend support.	702
4	Zoom FaxModem 56K 800/631-3116 www.zoomtel.com	May 98	$119	79	2:38/3:15	**FEATURES:** Supports K56flex, 16-bit ISA card, MNP-10EC, V.80 videoconferencing support, distinctive ring, COMit and WinFax Lite software. **PRO:** Affordable, Saturday support, easy to install, free upgrade to V.90 standard even if modem swap required. **CON:** Sluggish 56-kbps performance, support is a toll call.	703
5	Shark Multimedia Leopard 56K 800/800-3321 www.sharkmm.com	Jan 98	$80	78	2:38/3:04	**FEATURES:** Supports K56flex, 16-bit ISA card, MNP-10, V.80 videoconferencing support, distinctive ring, voice mail, speakerphone, VoiceView, ASVD, Caller ID, microphone, DialTone software. **PRO:** Lowest price, solid performer. **CON:** No weekend support, free upgrade to V.90 standard only if it can be performed through software.	704
6	E-Tech CyberBullet Modem PC56RVP 888/609-8885 www.e-tech.com	NEW	$129	78	2:47/3:10	**FEATURES:** Supports K56flex, 16-bit ISA card, V.FC and V.80 videoconferencing support, distinctive ring, voice mail, speakerphone, DSVD, ASVD, Caller ID, SuperVoice software. **PRO:** Feature-laden, mix of voice support. **CON:** Slow 33.6-kbps transfers, free upgrade to V.90 standard only if it can be performed through software.	705
7	NewCom 56K IFX Internal Data/Fax Modem 800/563-9266 www.newcominc.com	Mar 98	$89	78	3:25/3:16	**FEATURES:** Supports x2, 16-bit ISA card, distinctive ring, voice mail, speakerphone, VoiceView, password protection, Caller ID, QuickLink II software. **PRO:** Cheap with $10 price drop, toll-free support includes weekends. **CON:** Slowest 33.6-kbps transfers on chart, free upgrade to V.90 standard only if it can be performed through software.	706
8	Wisecom Accelerator Pro 56K Internal Voice Modem 888/947-3266 www.wisecominc.com	Jan 98	$99	77	2:40/3:09	**FEATURES:** Supports K56flex, 16-bit ISA card, voice mail, speakerphone, DSVD, ASVD, Caller ID, SuperVoice software. **PRO:** Low price, full-featured, toll-free support. **CON:** Manual too techie, 8-hour weekday support, no cross-ship modem replacement, free upgrade to V.90 standard only if it can be performed through software.	707
9	Boca 56K Tidalwave Modem 561/241-8088 www.bocaresearch.com	May 98	$119	76	2:39/3:14	**FEATURES:** Supports K56flex, 16-bit ISA card, V.80 videoconferencing support, Caller ID, QuickLink Message Center software. **PRO:** Good software, weekend support, reasonable price. **CON:** Slow 56-kbps connections, scant features, free upgrade to V.90 standard only if it can be performed through software.	708
10	3Com U.S. Robotics 56K Faxmodem 800/342-5877 www.3com.com	Sept 97	$160	75	2:31/3:16	**FEATURES:** Supports x2, 8-bit ISA card, distinctive ring, Caller ID, RapidComm software. **PRO:** Fast 33.6-kbps connections, thorough and easy-to-read documentation, free upgrade to V.90 standard even if modem swap required. **CON:** Pricey, no weekend support, fewer security features than the Courier model.	709

Best Buy online For reviews of products that didn't make the chart, visit www.pcworld.com/t10modems. All products: 907

TEST PC WORLD CENTER **HOW WE TEST** We test V.34 (limited to 33.6 kbps) modem-to-modem performance using a pair of identical modems on a Telecomm Analysis Systems simulated phone network. It sends a text file over 55 line conditions, and a mix of four files—graphics, text, program, and compressed files—over one line condition. For our x2 and K56flex performance tests, we call a local Internet service provider access number and transfer .jpg, .doc, and .zip files continuously over an 18-hour period. The times to transfer a megabyte of data are usually lower in the TAS test than in the ISP test because the files used in the latter are less compressible. Results for the two tests are not comparable. We currently do not test 56-kbps V.90 modem performance due to lack of ISP support. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.



IBM HOLDS ON to its Best Buy position with its affordable, full-featured 56K Modem. For $19 less, consider Diamond Multimedia's basic SupraExpress 56i. Though no faster than previous firmware revisions we've tested, the 56i is still one of the fastest modems on the list. Meanwhile, E-Tech's new voice-equipped CyberBullet debuts in sixth place, and Boca's 56K Tidalwave jumps to number nine—thanks to reasonable prices. ■

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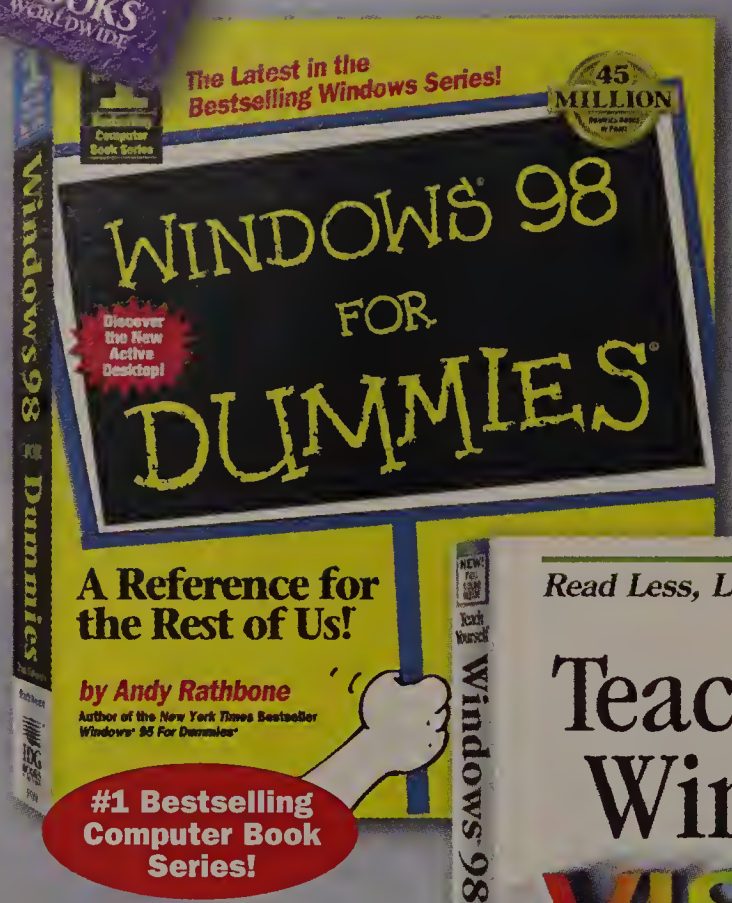

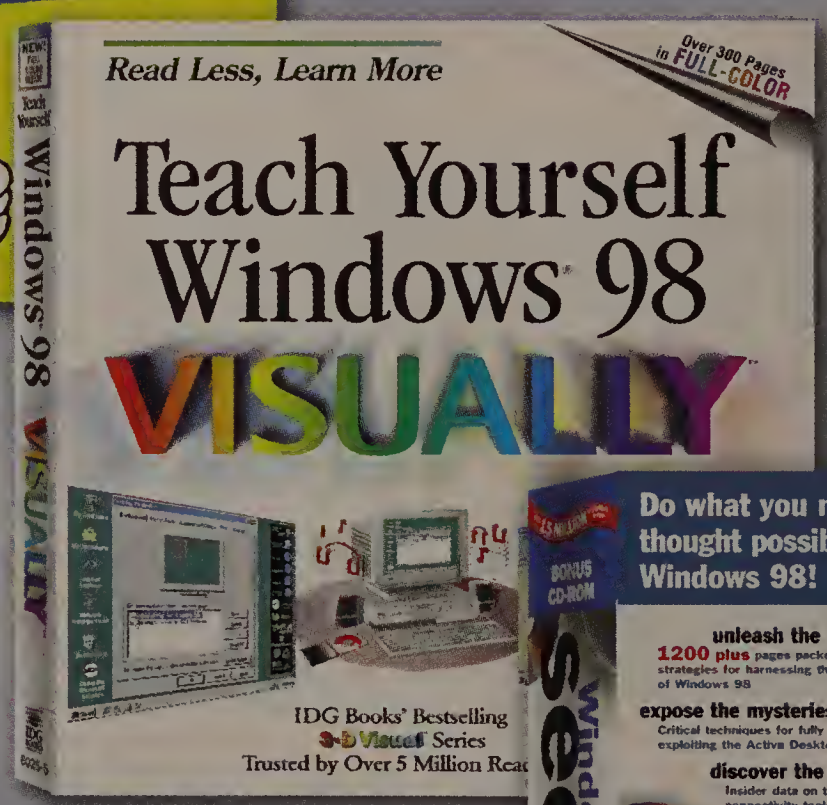

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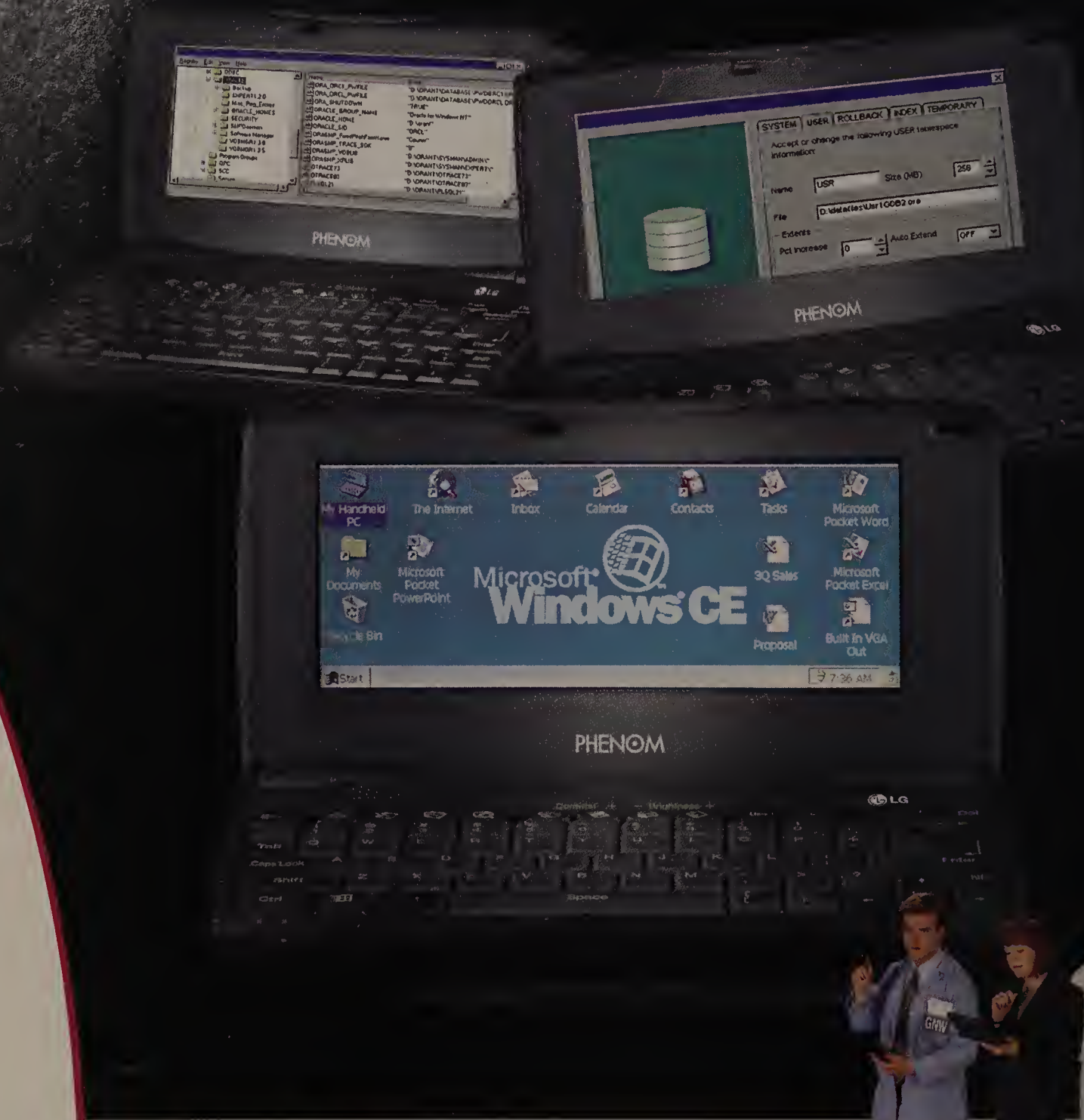

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Brightness*	400	550	750	600
Display Size	20" – 300"	30" – 300"	30" – 300"	21" – 600"
Optimal Resolution	SVGA 800 x 600	SVGA 800 x 600	SVGA 800 x 600	XGA 1,024 x 768
Max. Supported Resolution	1,024 x 768	1,024 x 768	1,024 x 768	1,280 x 1,024

*Brightness in ANSI lumens may vary up to 10% depending on room lighting and lamp conditions.

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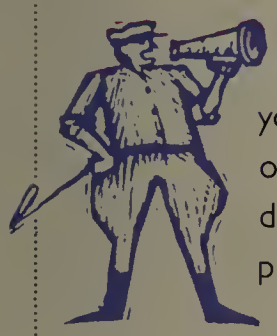
we're down to 50 minutes of content. The experts say a sharp presenter will spend up to five minutes elaborating on a single image, with a good rule-of-thumb average being about two-and-a-half minutes per slide. With that in mind, your 50 minutes now translate into 20 little vignettes—let's call it between 15 and 25 to take into account variations in the level of complexity of the presentation topic. Fifteen to 25 slides—absolutely no more. Now what?

For starters, consider these two important guidelines:

Your presentation should tell a story Figure out the conclusion first, then organize your information to support your message and arrive at your preordained conclusion logically and smoothly.

Present only what's needed to make a decision Overkill will only confuse. Don't try to score points by showing how much you know. Your audience will let you know if they want more information. If you feel you're leaving out vitally important information, include it in your leave-behind.

You are the director.



They always said "you ought to be in pictures." Here's your chance. Start by sketching out a simple story board. It doesn't have to be too complex—just enough to give an overall view of the presentation and guide the creation of your images. Use note cards or single sheets of paper to sketch out rough images and the accompanying points you'll want to make. If you simply must use a computer, use your software's "outline" view. Review and refine your content in this format until you're satisfied that it's hitting the essential points—it's a lot easier and less time consuming to make additions, deletions, and revisions at the story board level than it is to manipulate and edit with presentation software. At this point, your storyboard is now ready to guide the production of your presentation.

Image is everything.

When composing an image, keep in mind the following commandments:

It must be legible If it can't be read, it's useless. In general, 30 point font is a good starting point for text. If you can read it on a 15 inch monitor from about eight feet away,

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odds are your audience will be able to as well. Be sure to watch your line spacing. If separate lines are too close together the audience may mistakenly think they're part of the same idea. Experiment to get it right—and then be consistent on each image, throughout the presentation. To increase the ease with which text is read, avoid using all capital letters or vertical text. To make titles stand out, try contrasting fonts between body copy and headlines. For instance, use a sans serif face like Helvetica for the title and a serif such as Palatino for the body. Warning: You are not required to use every font your software is capable of generating! A single headline-body text combination throughout the entire presentation is best. Use bold, italics, and underlines for emphasis, but not too much. Remember, you're trying to convince with clarity, not coerce with a ransom note.

It must be relevant A picture is worth a thousand words, if it's the right one. Don't include images or pictures based on their aesthetic value alone. If they don't advance your agenda, they shouldn't be there. And even if they do fit thematically, avoid distracting and annoying clip-art cliches such as light bulbs, happy faces, bags of money, and locks and keys.

It must be simple Make your charts understandable at a glance. One main idea per image, and one image per slide, please. Keep flow charts and network diagrams down to the basic details, and avoid unnecessary labels. For growth or trends, horizontal line graphs work best. Consider putting

ViewSonic's PJ800 utilizes three LCD panels to project sharp, well-saturated color images.

What's ahead for LCD projectors?

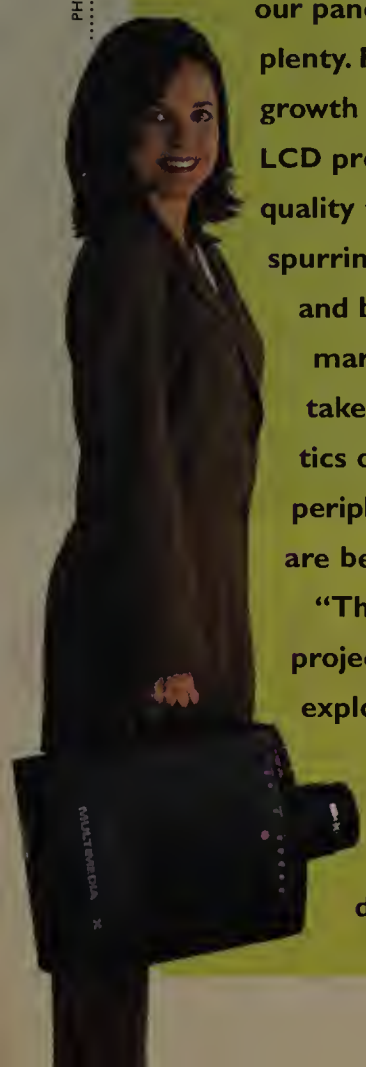

PHOTO COURTESY OF SANYO NORTH AMERICA CORP

What can we expect in the future from one of the hottest technology categories? According to our panel of industry pros, plenty. For starters, rapid growth in the popularity of LCD projectors is pushing quality to new levels and spurring innovation. Lighter and brighter. And as the market matures and takes on the characteristics of a true computer peripherals market, prices are being driven down.

"The ultra-portable projector market will explode during the next two years," says Dr. William Coggshall, president of Pacific Media Associates in Mountain View, Calif. "The product category will grow by more than 400 percent in the U.S. from 1997 to 1998," he adds. This on top of more than 200 percent growth in the previous year. Clearly, ultra-portables (projectors weighing less than ten pounds) are hot. "Ultra-portable projectors are starting to give consumers more choices," says Phil Callahan of Mitsubishi. "Product differentiation is delivering new alternatives—from the high end to the low end." Which means that the brightness and resolution that used to be available only with heavier machines is now starting to show up in this category. "The new standard for machines under ten pounds may soon be 600 ANSI Lumens," continues Callahan. And, of course, "it's got to be XGA," adds Gerald Ganguzza of Sharp.

Speaking of brightness, it's not too much of an exaggeration to say the sky's the limit. "Mega-bright" projection is being driven in large part by the increasing prevalence of Micro-Lense Array (MLA) technology in LCD substrates. MLA focuses the light to smaller spots in the LCD, making projection up to 40 percent brighter. "Down the road, we may have projectors capable of delivering up 2000 ANSI lumens," says Mitsubishi's Callahan. Advances in three-panel technology are also pushing the brightness envelope. "Three-panel technology is now finding its way into smaller,

(continued on page 267)

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the relevant numbers across the lines themselves so the audience can quickly associate the visual impact with the factual details you wish to convey. If you prefer vertical bar charts, be sure to place the description horizontally above or within the bar. For variety and originality, try changing the bar shapes.

As for text, keep it simple, also. Try the templates and wizards that come with your software, and once you've developed a format with the fonts and sizes you like, stick with it. When it comes to punctuation, much of what you know to be correct doesn't apply to presentations. For example, never use a period at the end of a title. Also, a bulleted or numbered

PHOTO COURTESY OF EIKI INTERNATIONAL, INC.

Use horizontal text for better readability.

LCD projectors *(continued from page 265)*

compact projectors," notes James Chan of Viewsonic. "Not only are the images brighter," he adds, "but the three-panel systems offer better color saturation."

Other changes in the market are coming from increased segmentation. "The market is splitting along three lines: ultra-portable, portable, and fixed-installation," says Clint Hoffman of Sony. And while the growth in ultra-portables leads the way, there's surprising interest in fixed-installation projectors weighing as much as 30 pounds. "Prices have come down, in some cases below $10,000," says Hoffman. "Presenters who want high-quality solutions for staged events and corporate boardrooms are taking a closer look at fixed-installation LCDs as an alternative to CRT. The resolution and brightness are not quite there, but it's moving in that direction," adds Hoffman. "At Sharp, we're seeing a significant increase in market segmentation," says Ganguzza. "Buyers have become much more sophisticated and vertical markets are beginning to drive product development," he adds. For instance, the price-sensitive education market wants fewer features, while the Fortune 500 buyer is looking for all the latest multimedia options. "We're offering more and more features to meet overall market demand, and we're offering them as options to meet specific user needs."

MITSUBISHI ELECTRONICS AMERICA, INC. X100 XGA LCD

Fixed-installation projectors are also seeing market growth.

The next big feature? PC cards. Viewsonic, among others, is already offering machines with PC card slots as all-in-one presentation solutions. "With a flash card presentation, you can leave your laptop in the office," says Viewsonic's Chan. Watch for every manufacturer to soon offer this alternative. And after that? How about built-in modems for presentations direct from corporate intranets. Or wireless projectors. We'll have to wait and watch, since our expert panelists aren't giving away any trade secrets. "The market is heading for technical parity," says Ganguzza. "And for buyers that means some pretty incredible technology is becoming very affordable."

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list should not have periods at the end of a line. Use key words or phrases as much as possible in lieu of complete sentences. Don't center—left justify all text. Have no more than five lines per image, with five or six words per line. If you have more than a couple of lines or bullets, build anticipation (and make it easier for the audience to follow) by dimming the points already covered as you move down the slide.

Use color carefully.

With all the options made possible by today's presentation technology, the key word is restraint. This holds especially true for color. Try to keep it to a minimum. For maintaining continuity, keeping the same background color throughout the presentation goes a long way. However, if you wish to break up major sections of your presentation by changing background colors, choose one from the same family. Your presentation software package will probably provide an ample selection of effective color schemes to work with. The main things to consider are providing a strong contrast between background and foreground (usually a dark background with light text such as white or yellow on navy blue) and limiting the number of colors to no more than three per slide. Avoid surprises: The hues that look so stunning on your 17-inch desktop monitor with 16.6 million colors might not be exactly what you expected when presented with a notebook supporting only 256. So test your colors on the exact equipment you'll be using.

The human element.

Let's assume that by now you've developed an on-target presentation (we'll cover what kind of information to include in our next installment) and have produced your images. Now it's time to deliver. Here are some simple guidelines to help make your presentation a smash:

Rehearse As much as possible, you want to be able to deliver your presentation without referring to the screen or note cards. So run through it several times in advance. If you can, get a "dummy" audience to critique your rehearsals.

Don't read it In developing your presentation you'll become thoroughly familiar with the subject matter. Use the slides as reminders of what you want to cover, but don't read them verbatim. Elaborate and ad-lib. If you want prepared podium notes, use three-by-five cards with bullet-point reminders—not a complete script. The idea is to get them on your side. So relax, be human, and maintain an open body language. Deliver your message—don't read it.

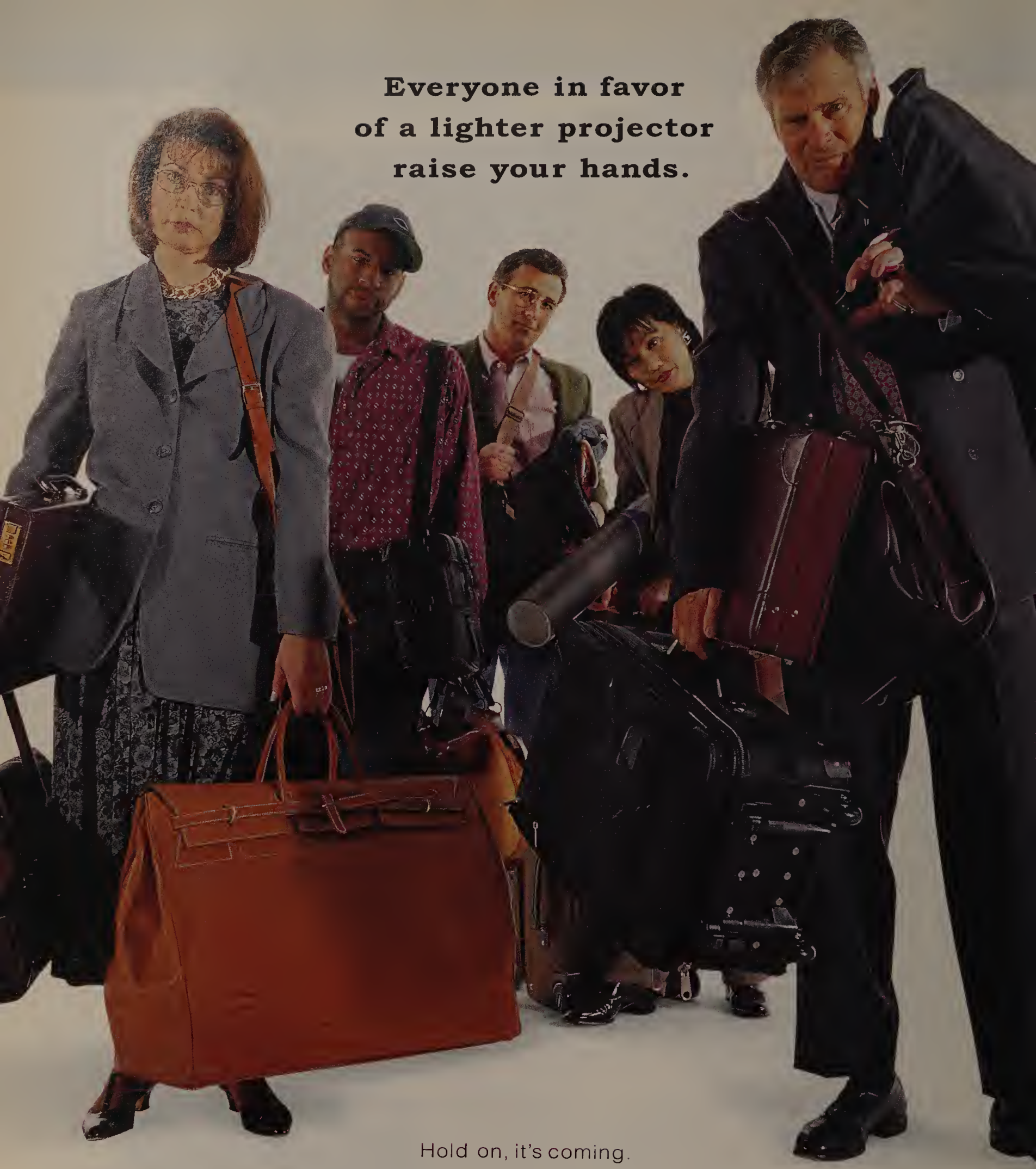
PHOTO COURTESY OF NEC TECHNOLOGIES, INC.

Use contrasting colors to make text "pop."

Face the audience The more you're prepared, the easier it is to maintain eye contact with the audience. Don't turn your back on them. Use a mouse for pointing out areas you wish to highlight on your slides.

Be receptive Listen to and watch your audience for cues as to how you're doing. If you think they're not "getting" it, ask if they need clarification. And be flexible. If it appears that they've got the point and want to move on, do it. Your ability think on your feet and adapt the presentation to their needs will demonstrate resourcefulness and consideration.

Be prepared Have a back-up plan in case of equipment snafus. Be sure to prepare and distribute complete handouts, including all



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Test your presentation on exactly the same equipment you'll be using.

the images in your presentation. Let your audience know that there's no need to copy all the information shown on the screen.

Any questions? Practice answering questions with your "dummy" audience during rehearsals. That will help anticipate questions that might come up. If you don't have an answer, don't make one up. Let them know you'll get back to them or, if possible, defer to others on your team or in the audience (but don't put anybody on the spot: use body language and eye contact to see if somebody else can handle the question).

Follow up If you've made any commitments to answer questions or provide more information after the presentation, be sure to follow through on your promises. Don't tarnish the reputation your sterling presentation has just established!

Coming up next.

Now you know how to produce and deliver a winning presentation. In our next installment we'll deal with content development from the human perspective and provide real-world case studies from professional presenters out in the trenches every day. Please stay tuned!

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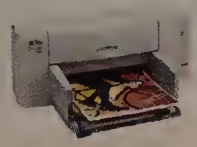

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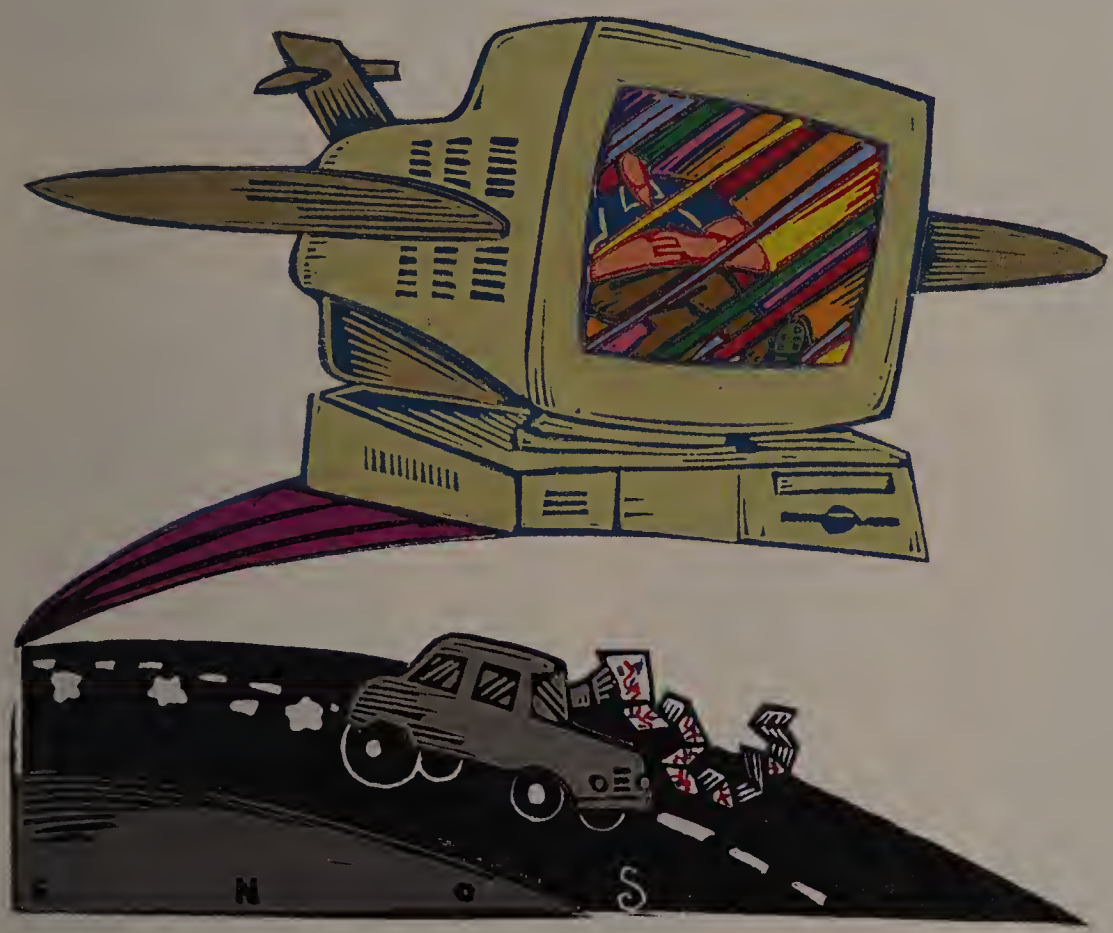


CALL ME ASPHALT. As a younger man, I followed my traveling jones from New Orleans to New York with little more than a full tank of gas, a backpack stuffed with a change of clothes, and a coffee-stained map I picked up at a filling station along the way.

The demands of working for a living and raising a family have taken that spontaneity out of my traveling activities these days; but with some careful planning, I can still sprinkle some leisure into my business trips. Other things have changed, too: I don't carry just a road map anymore. I have guidebooks. I have travel agents. And now I have the Web.

I was curious how the bevy of travel services on the Web would stack up against guidebooks and travel agents. An upcoming business trip out West gave me the perfect opportunity to find out.

BY THE BOOK

MY FIRST STOP was the travel section at my local Barnes & Noble. I wanted a guide to interesting sights along the way, and somewhere between *Best Boston Balloon Rides* and *The World's Most Dangerous Places,* I found it: the superb *Fodor's USA 98*. This 1070-page travel partner calls itself "the most up-to-date guide to the best of everything in all 50 states." It lives up to that billing with extensive descriptions of interesting American sights, backed up with details of where to stay, where to eat, and how to get there.

A good travel book has three big advantages over Web-based travel guides: It's portable, it doesn't require a computer to use, and it has an instant start-up feature called "turning the page." Even so, a book can take you only so far: *Fodor's USA 98* couldn't arrange my transportation and accommodations. To get the ball rolling, I got a local travel agent on the horn. I needed an airline ticket—the cheaper the better—from Winston-Salem, North Carolina, to Salt Lake City, then on to Denver and finally back home. I also wanted a ticket for my oldest son to join me in Denver so we could check out some dinosaur digs and maybe even do some rafting. I needed to arrange for a car and hotel rooms for most of the trip.

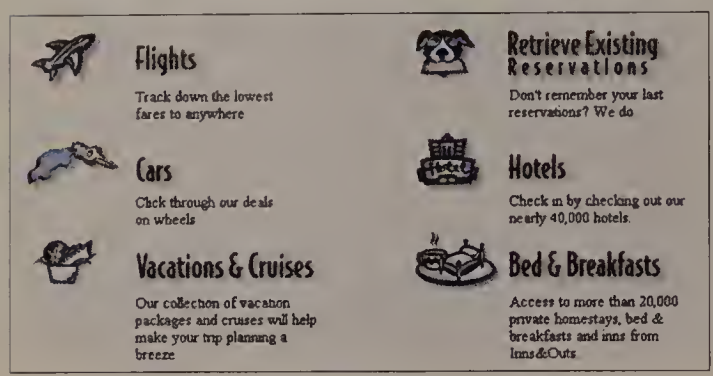
The travel agent promised to get back to me that same day with the lowest fares. A few hours later, she called with a $642 flight that she said was a great deal. But there was a catch: I'd have to drive an hour-and-a-half to Charlotte to fly TWA. When I asked her about other trip ▶

ILLUSTRATION: RANDALL ENOS

details—rental cars, hotels, sightseeing possibilities—she said she'd get right on it. As it turned out, I waited a week and she never called back.

HIT THE WEB, JACK

THAT'S WHEN I consulted the Web. When the road calls, I get impatient. I suspected I could do the planning just as well as (and probably faster than) a travel agent. What I needed was a travel Web site I could count on for low plane fares, hotel rooms, a set of wheels, and if possible, some local color.



THE MASTER PLAN: Travelocity helps you plan every part of your trip, but the booking feature can be awkward to use.

The three travel sites I liked the most—Travelocity, Expedia.com, and Preview Travel—deliver the goods and share some traits: easy-to-use trip planning, secure online ordering and electronic ticketing (e-tickets), personal profiles for storing travel preferences, and e-mail bulletins to alert me about especially cheap fares to favorite destinations. Better yet, they're free. Interestingly, all of the sites offered the same airfare (the total was $472—way below the $642 my travel agent had assured me was "a great deal").

Visiting the leisure-oriented **Travelocity** (www.travelocity.com) is like browsing a bookstore's travel aisle. Click a spot on the site's map, and the Destination Guide provides a quick summary of the people, the land, and the culture. The site also gives an excellent breakdown of vacation packages and a separate listing of bed-and-breakfast inns.

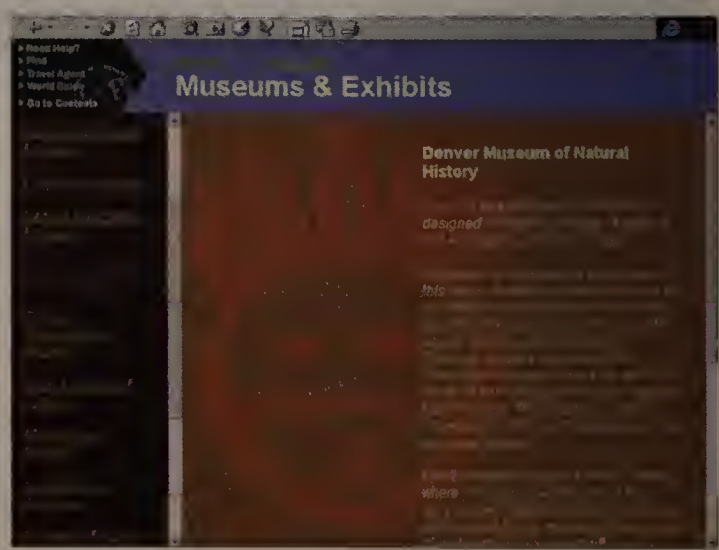
Travelocity handled all of my plane, car, and hotel reservations with an easy-to-understand planner. No surprise there—it's operated by the Sabre Group, whose parent company, AMR, also owns American Airlines. But the Travelocity system lacks some basic features and intelligence that would make it more useful: It wouldn't let me save itineraries for review later, and I had to go back and forth between the booking screen and the airline selection screen to double-check my choices. For example, typing Delta wasn't enough—I had to choose between Delta and Delta Express on a second page, then return to the first page to enter the correct airline code. That small annoyance was offset by the ability to obtain a specific seat assignment (a new option available for most flights on Delta, American, and United Airlines).

ROAD SMARTS

MICROSOFT'S **Expedia.com** (www.expedia.com) was a little smarter. The site's driving destination planner, with its accurate road directions, came in handy when I realized my son and I would want to do some sight-seeing outside Denver. For my side trip to Dinosaur National Monument, I entered Denver as the origin and Dinosaur, Colorado, as the end point. Expedia.com gave me good directions and estimated the driving time. (Another reviewer had a less favorable opinion of Expedia.com's driving directions. See "Going Worldwide on the Web," page 134, in May.) It's too bad the site didn't also give me a door-to-door map (instead, I got an area map and a plug for Microsoft's travel-planning software). I ended up printing out the Web page and tucking it in my guidebook.

Flight, hotel, and car reservations were secure and easy to select. Expedia.com can save itineraries, allowing you to compare options or make changes before finalizing your reservations.

I liked the *Fodor's USA 98* guidebook so much that I decided to check out its Web site (www.fodors.com). In addition to offering updated travel articles and tips, the site provides a link to **Preview Travel** (www.previewtravel.com), another Internet booking agent. Preview carries considerably more than the requisite vacation package guide and business traveler tips. As with the other booking sites, I logged on to a secure server; entered a destination, date, and time of travel; selected an airline; and waited while the system built a list of flights for each segment of my journey. A big bonus comes from the site's partnership with *Fodor's:* I chose ▶



SEEING THE SIGHTS: Expedia.com helps plan visits to local attractions, as well as book plane tickets and hotel rooms.

ILLUSTRATION: HARRY CAMPBELL

SCORECARD

Biztravel.com
Grade: **B+**; www.biztravel.com

Expedia.com
Grade: **A**; www.expedia.com

Flifo
Grade: **C+**; www.flifo.com

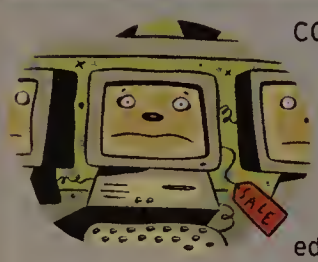
Fodor's USA 98
Grade: **A-**; $21.95 list; Random House, 1997; 800/793-2665; www.fodors.com
READER SERVICE NO. 714

Preview Travel
Grade: **A-**; www.previewtravel.com

TheTrip.com
Grade: **B+**; www.thetrip.com

Travelocity
Grade: **A-**; www.travelocity.com

F Y I



COMPUTERS? No thanks! Twenty percent of U.S. adults polled aren't interested in owning a new PC at any price. The number one reason: They just don't think they need one.

SOURCE: FORRESTER RESEARCH

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WINDOWS WIN 100

Denver from the site's Destination Guides and was treated to an overview of the city as well as to great information about restaurants and nearby attractions.

After creating a flight itinerary, I repeated the process for hotels and rental cars. The other sites work roughly the same way, but Preview's Business Travel Center deserves high praise for its numerous links to travelers' services ranging from toll-free phone numbers for rental car agencies to currency converters and worldwide ATM locators.

BEST OF BOTH WORLDS: Preview Travel's Destination Guides have lots of content from Fodor's travel books.

GET DOWN TO BUSINESS

IF EFFICIENCY MATTERS more than money, make **Biztravel.com** (www.biztravel.com) your point of departure. Unlike the other sites I looked at, Biztravel.com let me book reservations for flights, cars, and hotels in one step. The site also offers BizMiles, a feature that lets you track frequent flier points for all your accounts.

But Biztravel.com can throw you a curve if you don't take the time to fill out all the preferences on the introductory travel-planning pages. When I failed to select a carrier, Biztravel.com cited a fare of $1540 on United. (I wanted to fly on the plane, not buy a permanent seat.) I stepped back a page, specified Delta as my preferred carrier, and bingo—the price of my two-leg flight dropped to $472.

Next, I embarked on **TheTrip** (www.thetrip.com). Like Biztravel.com, TheTrip caters to business travelers. I was able to make arrangements according to my personal preferences, but the site was also quick to suggest alternative itineraries at much lower fares. I also liked the detailed hotel descriptions and driving directions from the airport to my hotel, plus the brief, informal accounts of nearby points of interest.

A less impressive design greeted me at the globally linked **Flifo** (www.flifo.com). Like all of the other sites I looked at, it offered basic tools for booking airline tickets, hotel reservations, and car rentals. Getting the best airfare, however, involved a somewhat laborious two-step process. First, I had to lay out my itinerary and select my preferred airlines. After browsing the flight choices, I selected the ones that best fit my travel plans. Only then did Flifo start looking for the lowest fare. One plus, though: When my fare hit the screen at a whopping $1659, Flifo's "Fare Beater" immediately suggested a few economical alternatives. By moving my departure time from 8 p.m. to 10 p.m., Flifo sliced $1187 off the ticket price, yielding a much more affordable fare of $472 (the same price the other sites found right away).

Now that I have my itineraries in order, I'm ready to fly, but I won't give up my paper guidebooks just yet. (I can't say the same of my travel agent.) With low fares, 24-hour access, information on the local scene, and instant ticketing, Internet travel sites will be making my reservations from now on. Don't call me Asphalt anymore. Call me Wings.

Peter Scisco is a freelance writer living in Winston-Salem, North Carolina. ■

F Y I

BIG BROTHER is the greatest threat in cyberspace, say Web users. In a recent worldwide poll, they voted privacy and censorship as the top two issues facing Internet users today, far outstripping taxation and other menaces.

SOURCE: GEORGIA INSTITUTE OF TECHNOLOGY

KEEPING UP

Watch Your Speedometer

IT WAS UNINTENTIONAL, of course, but you caught yourself cruising along at 43 miles per hour in a 30-mph zone—and so did a police officer. But if you got the ticket in the right part of California, Texas, or Florida, you can now avoid an insurance-rate hike by attending an online traffic school such as www.onlinetrafficschool.com or www.webtrafficschool.com. Pass one of these Web-based courses in driving safety (which cost less than $30 and usually take 4 to 8 hours to complete), and the offense gets wiped off your record. Look for more states to offer this option in the future.

Untethered Computing

FEELING TIED TO your computer? Cut the cord with the new $99 Cordless Desktop from Logitech. This full-size combination of a wireless keyboard and a mouse not only reduces cable clutter; it lets you tuck the PC far behind your desk or kick back with the keyboard in your lap. Because the Cordless Desktop relies on radio-frequency technology, Coke cans and other physical barriers don't break the lines of communication. My only gripe: The mouse, elegantly sculpted for the right hand, provides only mediocre fit for southpaws like me.

• **Cordless Desktop**; $99 list; Logitech; 800/732-3039; www.logitech.com

READER SERVICE NO. 715

Hometown Flavor Online

BOSTONIANS DOTE ON Legal Seafoods' clam chowder; Cincinnati is rife with Skyline chili junkies. Every city has its own beloved comfort foods, and The Homesick Gourmet (homesickgourmet.radish.net) is a great place to find them. This site features links to dozens of regional food merchants who will ship their goodies to nostalgic exiles and other hungry Web surfers. The cost can be steep—an emergency shipment of 72 Sabrett's hot dogs from New York will set you back $90—but the tastes of home are priceless.

—Harry McCracken

ILLUSTRATIONS: HARRY CAMPBELL

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The Best Help Money Can Buy?

IT WAS TUESDAY night, 10 p.m. I finished a level in Quake II and started on my wife's PowerPoint presentation. The job was a slam-dunk and, heck, it wasn't due until morning. But in minutes I was sweating bullets. I was in over my head and needed tech support pronto. The surprise? I found immediate help from living, breathing people.

But not from Microsoft—PowerPoint's tech support was shut down tight for the night. Instead, I called on Intel's AnswerExpress and competitor PC Crisis Line, two fee-based help services. Neither is cheap but both offer helpful experts who work late to solve your hardware and software troubles. Well, most of the time.

DIALING FOR DOLLARS

OKAY, I'LL ADMIT IT—the whole thing was a setup. For a month, I pestered the two services with typical home-office PC questions to see who I could stump. With AnswerExpress, you send questions over the Internet and wait for a call back. PC Crisis Line is more direct: You get on the horn. My attitude? Wary. I figured I could do just as well by reading the manual.

Most of my real-life problems were snafus I've experienced with Word, Excel, Eudora, QuickBooks, and Corel Ventura. I lobbed a few system and printer questions, and tested each service's ability to deal with a DOS database program. But a few of my problems were so difficult they made Office 97's paper clip cringe.

Intel's AnswerExpress was first on my list and it's amazingly cool. (For a differing opinion of the service, see June's *Top of the News*.) But take a deep breath: You have to spend $50 for a three-month subscription that permits just seven problem calls. After that, a $15 per month minimum covers just one call. Additional calls are $20 each. There's no limit on the length of the call, but try to slip in another unrelated problem and you get whacked for another call. It's available seven days a week from 5 a.m. to 11 p.m. Pacific time.

> Some of **my problems** were so **difficult**, they made Office 97's paper clip **cringe.**

Here's another gotcha: The AnswerSuite client software relies on Internet Explorer 4.0, something I don't want, though it didn't harm my system.

AnswerExpress Support Suite
$50 for three months, $15/month thereafter; or $185 for a full year. Intel, 888/795-7357; www.answerexpress.com
READER SERVICE NO. 710

PC Crisis Line
$3 per minute for first 10 minutes, $1 for each additional minute. 800/828-4358; www.netbox.com/pccrisis
READER SERVICE NO. 711

To get help, you type a question into AnswerSuite, which sends it through your Internet account to Intel. The techs then call you back; most of my return calls came within 10 minutes.

My first moderately difficult question was about FoxBASE+, an ancient program with the dreaded year 2000 problem. An AnswerExpress tech called me back in three minutes, clarified my question, put me on hold (on his dime), and then came back with the answer. I never felt rushed or intimidated; as a matter of fact, the guy seemed to be enjoying himself.

But when I described my network configuration nightmare, Intel gave up and recommended I find a network consultant. Fair enough: Networks aren't on the list of over 100 supported apps, and the service didn't count the call as one of my seven.

CRISIS? CALL ME!

ANSWEREXPRESS IS good, but I preferred PC Crisis Line, a 24-hour, seven-day service. It's more expensive: $3 per minute for the first 10 minutes (2-minute minimum), and $1 per minute thereafter. But as with Intel, the call's toll-free and there's no charge if the techies can't help you. Best of all, you pay only if you use it—no $200 a year if you don't need help.

PC Crisis Line is technically savvy and eager to help. On many calls, I was charged only the minimum fee of $6. It's also quicker than AnswerExpress: Just pick up the phone and start talking.

PC Crisis nailed my FoxBASE+ question, doing the research on its own time and charging me the minimum fee. The service was successful with all my application questions but, like Intel, suggested I bring in a network expert.

Oh, and Office 97's paper clip? Still bent out of shape.

Contributing Editor Steve Bass, a licensed marriage and family therapist, is president of the Pasadena IBM Users Group. He can be reached at steve_bass@pcworld.com (see page 14 for more information). ■

ILLUSTRATION: HARRY CAMPBELL

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HERE'S HOW

WINDOWS TIPS SCOTT DUNN

Picks and Pans for Win 98 System Tools

THE PRERELEASE VERSION of Windows 98 we used includes system tools to keep your PC working smoothly. Some are old (Backup, Disk Defragmenter, ScanDisk, Resource Meter), while others are imported (DriveSpace, Compression Agent) or modified from Microsoft Plus (Scheduled Tasks, an automation tool that replaces System Agent). But the newest ones should make you take notice.

Here are a few of my favorites, and a couple I can easily do without.

Disk Cleanup combines the chores many of us have been doing for years manually or with batch files: It deletes useless files such as those in the Windows Temp and Internet Explorer cache folders. Disk Cleanup also lets you empty the Recycle Bin and provides easy access to the Windows utilities for uninstalling applications or converting your hard disk to FAT32. Despite a cumbersome interface, it offers safe, reasonably effective, one-stop shopping for most disk-housekeeping chores.

Drive Converter lets you transform your existing FAT16 hard disk to FAT32 without repartitioning. Besides supporting large (over 2GB) EIDE disks, FAT32 uses smaller clusters (as small as 4KB, according to Microsoft) that can save loads of disk space. The downside is that FAT32 isn't compatible with other operating systems, including older versions of Windows. For the full scoop, start the Converter to inspect its installation wizard. Then click *Details* and read about all the drawbacks before you commit yourself.

System File Checker keeps important Windows 98 files in working order by sifting through vital system files and letting you know which ones Windows doesn't think are installed appropriately. You can either restore the files or correct the utility's impression of what's right for your computer. If you take the former route, System File Checker will back up the files it replaces, so you're covered in any case. Best of all, you can customize System File Checker to monitor your important files.

System Information supplies detailed data on such hardware settings as IRQs and I/O addresses (Resources), the Windows configuration (Components), and software currently in memory (Software Environment). It can also act as a viewer for various system files, including CAB files, Dr. Watson files, and text. Don't worry if it doesn't make sense to you: The tool is intended for support technicians, who will guide you through the application to get the information they need.

Welcome to Windows launches a multimedia propaganda—oops, extravaganza—to play up what's new in Windows 98. Why it's in the System Tools menu is obscure. My advice: Click around to see if it answers any of your questions; then delete welcome.exe from your Windows folder.

Windows Tune-up is basically a Microsoft wizard that prompts you through automatic scheduling of several simple utilities (ScanDisk, Disk Defragmenter, and

ILLUSTRATION: DOUG ROSS

Disk Cleanup). If you're already using these utilities and can feel your way around Schedule Tasks, you can remove tuneup.exe from your Windows folder.

ONE-CLICK EXITS

WANT AN EASY WAY to shut down Windows? Ryan Pfeifle of Thousand Oaks, California, suggests this approach: Right-click the desktop and choose *New•Shortcut*. Then type **c:\windows\rundll.exe user.exe,exitwindows** (your path may differ), click *Next*, type a name for the shortcut, and click *Finish*. Double-click this icon anytime to exit Windows.

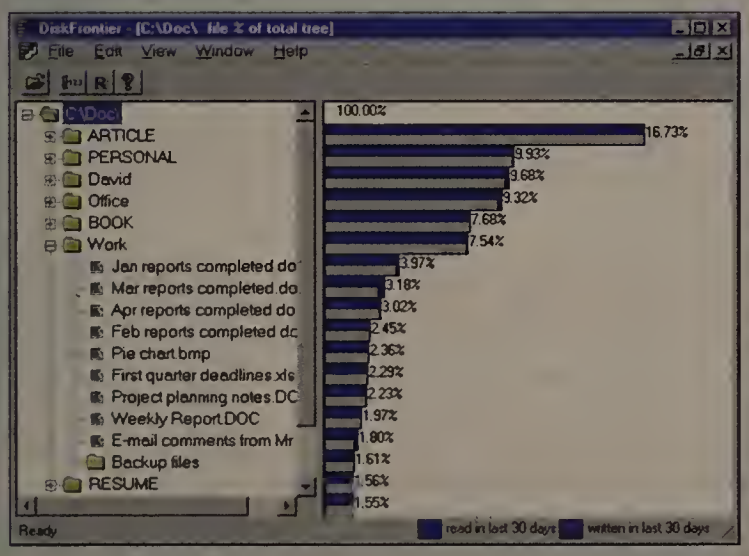
To create a keyboard shortcut for exiting, right-click the icon, select *Properties* from the menu, click the *Shortcut* tab, and click in the *Shortcut key* box. Press the keys you want to use to activate your shutdown shortcut (they must begin with **<Ctrl>-<Alt>**, **<Ctrl>-<Shift>**, or **<Shift>-<Alt>**).

If you want a shortcut that restarts Windows rather than simply shutting it down, change the command line in the Target box to read **c:\windows\rundll.exe user.exe, exitwindowsexec** (your path may differ).

WINDOWS TOOLBOX

Track Down Bloated Folders

WONDER WHAT'S taking up all the space on your hard disk? DiskFrontier tells you in a bar chart that displays folders and files in order of size, with numerical readouts in bytes or percentages. Drag and drop the DiskFrontier Shortcut into the Windows\Sendto folder. Then right-click any folder and choose *Send To•Disk Frontier*. DiskFrontier is free for noncommercial use, $25 otherwise. It's available on PC World Online or direct from its creator, Choice Computing, at www.choicecomp.com.

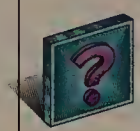


NORTON TURN OFF, TURN ON

NEED TO TURN OFF Norton Navigator's options in a hurry? Try this: Choose *Start•Programs•Norton Navigator•Norton Navigator Control Center*, hold **<Ctrl>** and **<Shift>** as you click the left and right mouse buttons simultaneously, and click *OK*.

But what if you want to turn *on* all Norton Navigator's options? Just hold down **<Ctrl>** as you click the left and right mouse buttons simultaneously in the Control Center window. Then click *OK* or *Apply*.

UNCLUTTER YOUR DESKTOP



IS IT POSSIBLE to make one shortcut that will start two or three applications? This would be useful for certain applications that I always use simultaneously, such as Netscape Communicator and a timer, and it would save me from having to double-click each shortcut.

Michel Martineau, St. Léonard, Quebec

NO PROBLEM. In Windows 95, 98, and NT 4.0, you can create a batch file that launches as many programs as you want. Open Notepad and type **start** followed by a space and the command line of an application (for example, **c:\windows\calc.exe**); then press **<Enter>**. If your path includes long file or folder names, you must either enclose the path with quotation marks (for example, **"c:\program files\accessories\mspaint.exe"**) or use shortened versions of the long names (for example, **c:\progra~1\access~1\mpaint.exe**). Add more lines following this pattern for each program you want to start with one icon (see **FIGURE 1**).

When you're finished, choose *File•Save* and type a file name (in quotation marks) with the **.bat** extension. (The quotation marks keep Notepad from overriding the .bat extension with its default .txt extension). Double-click the batch file (or its shortcut) to launch the programs.

Launching multiple programs with one icon is not a feature of Windows 3.1, but File Manager provides a minor exception. In Program Manager, select the File Manager icon and press **<Alt>-<Enter>** to open the Program Item Properties dialog box. At the end of the Command Line, type a space, then the path to another application. Click *OK*. The File Manager icon will now launch itself plus the new application simultaneously.

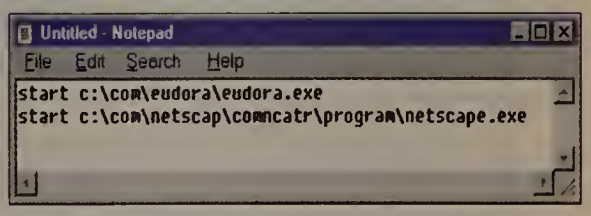


FIGURE 1: START MULTIPLE PROGRAMS from one Shortcut by creating a simple batch file.

ICONS FOR ALL OCCASIONS

ON MONDAY, you need an application to start in the Budget directory. On Tuesday, you work in the Projects directory. Instead of digging through dialog boxes to get to the right ▶

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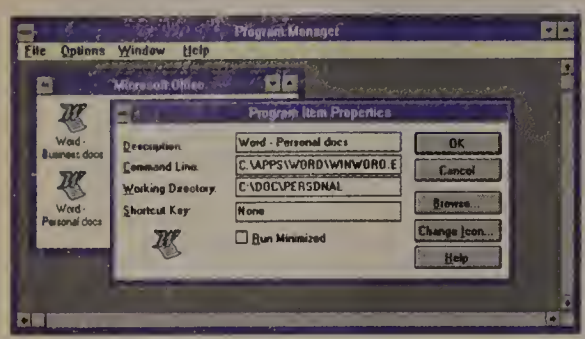

FIGURE 2: START AN APPLICATION differently for each task by creating custom icons.

location, create a separate icon to start each program the way you want.

Here's what to do. In Windows 95 and 98, find the icon for the program whose start-up options you want to customize, right-drag it to an empty area, and choose *Copy Here* from the menu. Right-click the new icon, select *Properties*, click the *Shortcut* tab, and in the 'Start in' box enter the path to the directory you want this copy to start in. Click the *Run* drop-down list and choose how you want this application started—in normal, minimized, or maximized view. Click *OK*. With the icon still selected, press **<F2>** and enter a name that distinguishes it from the original icon.

In Windows 3.*x*, open Program Manager and find the icon for the program you want to customize. Create a copy of the icon by holding down the **<Ctrl>** key as you drag the icon to a new spot in its group window. Select the new icon and press **<Alt>-<Enter>** to display its Program Item Properties dialog box (see **FIGURE 2**).

Edit the text in the Description box to distinguish this program item from the original. If the program supports optional switches, you can type those at the end of the Command Line. Type a new location in the Working Directory box if you want this program item to start in a particular location. Check *Run Minimized* if you sometimes want to start this application as a minimized icon. Click *OK*.

Now, you can get right to work without having to do any extra clicking.

MANAGE FILES FROM THE KEYBOARD

FILE MANAGEMENT involves spending a lot of time selecting and deselecting the files you want to copy, move, delete, and so on. Most Windows users are taught to do this with the mouse (plus <Shift> or <Ctrl> to select multiple files). But sometimes it's faster to keep your hands on the keyboard.

The table below shows some little-known shortcuts for getting around Explorer or File Manager using just your keyboard.

CALL THE TUNE IN MULTIMEDIA PLAYER

IF YOU DOUBLE-CLICK a movie file associated with the Media Player accessory, you'll see the movie, but with limited playback controls.

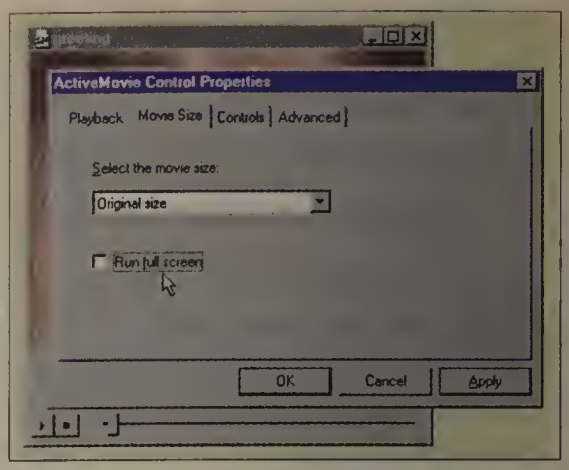

FIGURE 3: RIGHT-CLICK A MOVIE and select Properties to control how you view it.

Not to worry. Just double-click the title bar to display the normal Media Player window with complete menus and controls for resizing, auto-rewinding, or otherwise modifying your view of the movie.

If your system runs movies with ActiveMovie, as it will under Windows 98, just right-click anywhere in the movie window, and choose *Properties* to get all the controls (see **FIGURE 3**).

Find files from this article on PC World Online at www.fileworld.com. Windows Tips *welcomes your tips and questions and pays $50 for published items. Scott Dunn is a contributing editor for* PC World *and a principal author of* The PC Bible, 2nd Edition *(Peachpit Press, 1995, 800/283-9444). See page 14 for contact information.* ■

EXPLORER AND FILE MANAGER KEYBOARD SHORTCUTS

ACTION	Windows 3.x File Manager (in right pane)	Windows 95 Explorer (in right pane)
Select a contiguous range of files or folders.	Select the first file in the range; then hold down <Shift> while you press the <Down Arrow>.	Select the first file in the range; then hold down <Shift> while you press the <Down Arrow>.
Select a noncontiguous range of files or folders.	Select the first file, press <Shift>-<F8>; then press the <Down Arrow> to move to the next file, and press <Space> to select it.	Select the first file, hold down <Ctrl> while you press the <Down Arrow> to move to the next file, and press <Space> to select it.
Select all items in an open folder.	Press / or <Ctrl>-/.	Press <Ctrl>-A.
Select from the main menu.	Press <Alt> and the underlined letter of the menu name; then press the underlined letter of the menu command.	Press <Alt> and the underlined letter of the menu name; then press the underlined letter of the menu command.
Open selected file(s).	Press <Enter>.	Press <Enter>.
Open a selected file's Properties dialog box.	Press <Alt>-<Enter>.	Press <Alt>-<Enter>.
Rename a selected file or folder.	Press <Alt>-F, press N, and enter the new name.	Press <F2>, type the new name, and press <Enter>.
Display a selected item's shortcut menu.	No keyboard shortcut.	Press <Shift>-<F10>.

MANAGE YOUR FILES in Explorer and File Manager, without ever touching the mouse, by using these keystroke combinations.

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Create Custom Templates in Any Word Processor

IF YOU NEED A TEMPLATE for company letterhead, invoices, or other heavily formatted documents you create regularly, you could modify one of the built-in templates in your favorite word processor.

Better yet, you could start from scratch and make your own templates. It's easy. Here's how to create customized templates in Word and WordPerfect. (See **STEP BY STEP** for an illustration of the steps for Word.) Afterward, you'll be able to access your new templates by selecting *File•New* in your program.

Word 6.0 and later: If you have a formatted document you can use as a model for your template, open it, then delete all text that won't be common to all documents created with this template. Retain other parts of the document, including the graphical elements. Skip to step 6.

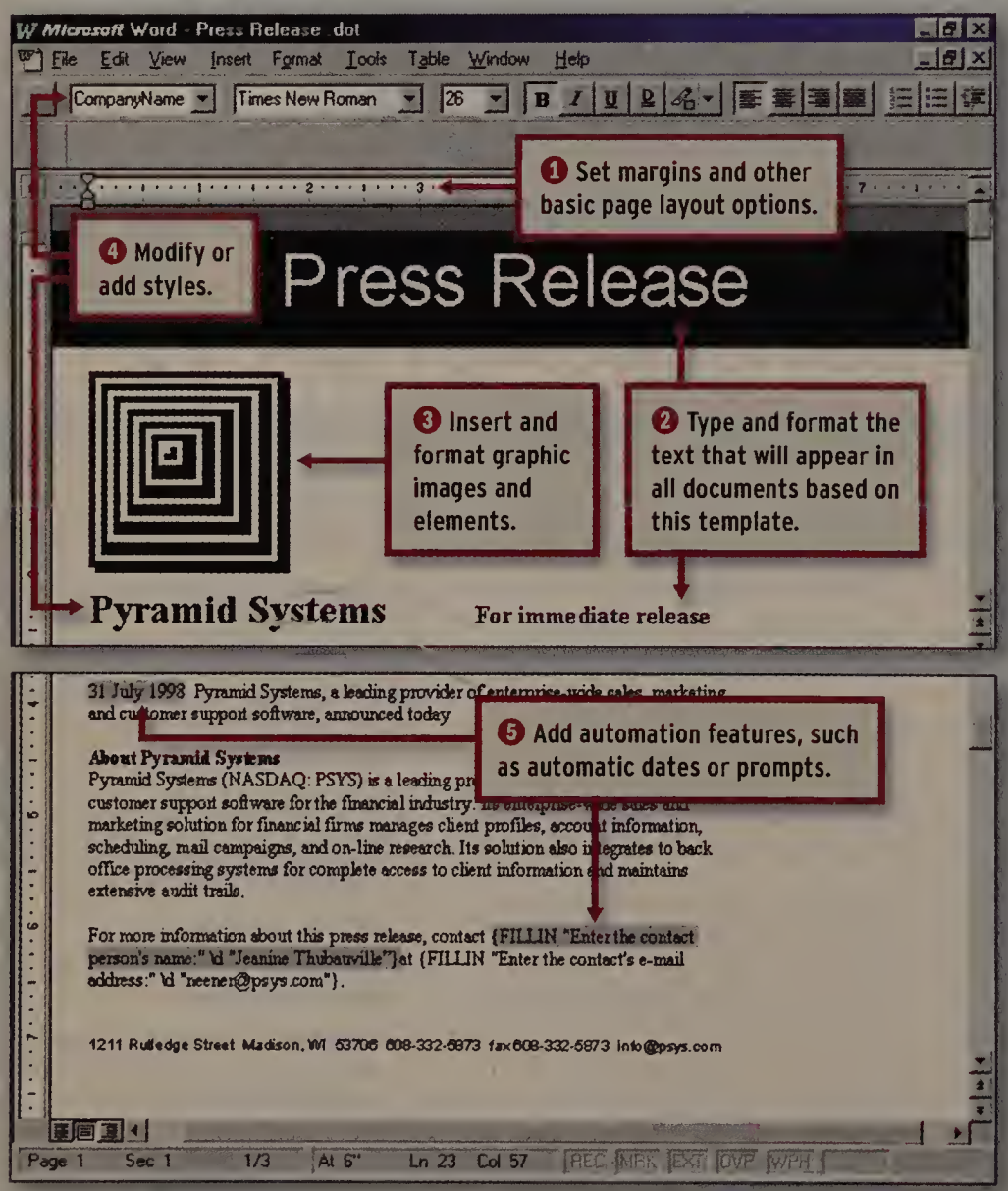
1. To create a template from scratch, select *File•New* and choose the *Blank Document* icon or the *Normal* style sheet (version 6.0) in the New dialog box, then click *OK*. Select *File•Page Setup* to set margins and other basic page layout options.
2. Type and format any text that you want included in all documents created with this template.
3. Using normal Word tools, insert and format any graphical images needed in all documents, along with borders, lines, blank tables, and other graphical elements.
4. To add special text styles to the template, select *Format•Style* and modify existing styles or create new ones from the Modify Style or New Style dialog box.
5. If you want to add automation features, such as automatic dates or prompts that ask the user for text, position your cursor where you want the prompt to go, and then select *Insert•Field*. To insert the current date, for example, select *Date and Time* in the Categories list of the Field dialog box and choose *Date* in the Field Names list. Click *Options* to pick a date format. If you want to prompt users for text, add a fill-in field: Select *(All)* in the Categories list, then click *Fill-In* in the Field Names list. See Word's built-in help for information on how to use fields to automate your documents.
6. Once you're satisfied with the template, select *File•Save As*. In the Save ▶

Turn Off Bullets and Numbering in Word

ONCE YOU START a numbered or bulleted list (by typing either a number and a space, or an asterisk, at the beginning of a line), Word continues to add a number or bullet each time you press <Enter>. How do you shut this feature off once you've finished the list? After pressing <Enter>, click the *Numbering* or *Bullets* list icon on the main toolbar. This will work even if you didn't use the icons to start the list.

STEP BY STEP

Build Your Own Template From Scratch in Word



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As dialog box, choose *Document Template* in the 'Save as type' list. Type a file name in the 'File name' field. Click *Save*. If you're working in Word 95 or 97, the new template will appear under the General tab in the New dialog box. To save it under a different tab, double-click the appropriate folder icon before you click *Save*.

WordPerfect 6.0 and later: WordPerfect won't let you save an existing document as a template.

1. Select *File•New*, then choose *Options•Create WP Template* (in WordPerfect 8) or *Options•New Template* (in WordPerfect 6.x and 7) in the New dialog box. Then select *File•Page Setup* to set margins and other page layout features (in version 8), or use commands in the *Format* menu (in earlier versions).
2. Type and format any text that you want included in all documents created with this template.
3. Using the customary WordPerfect tools, insert and format any graphical images needed in the document, along with borders, lines, blank tables, and other graphical elements.
4. If you have special text styles you want to use in the template, select *Format•Styles* and modify existing styles or create new ones in the Style List dialog box.
5. If you want to add automated prompts to help users create a document, place the cursor where you want the prompt, then click *Build Prompts* on the template bar. Follow the instructions in the Prompt Builder dialog box to add prompts, then select a prompt and click *Paste* to insert it in the template.
6. Once you're satisfied with the way your new template looks, select *File•Save As*. In the Save Template dialog box, type a description of the template in the Description field and type a file name without a file extension in the 'Template name' field. Then choose an appropriate document type in the 'Template group' list, and click *OK* to save your template.

Lay Off Word 97's Assistant

MICROSOFT BELIEVES that its animated Office Assistant feature is all the rage. Not everyone agrees. You could get rid of it completely by using the Setup program to remove it from your PC, but then you'd also lose the handy, plain-English help feature.

Here's how to force the pesky helper to stay in its cubicle until you summon it. This trick works in all Office suite applications as well.

If the Assistant isn't visible, display it by clicking the *Office Assistant* icon or by pressing **<F1>**. Next, right-click the Assistant itself, then select *Options* from the pop-up menu. In the Office Assistant dialog box, clear all selected options, and then click *OK*.

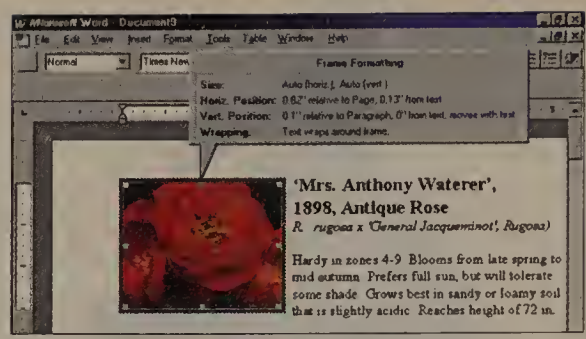

FIGURE 1: WHAT FONT? How big is that graphic? Press <Shift>-<F1> and click the item to see.

GET QUICK FORMATTING INFO IN WORD

YOU CAN GET instant information about the formatting of any text or graphic in a document, but few Word users know this little trick. Press **<Shift>-<F1>**, which turns the mouse pointer into a question mark with an arrow. Click on the text or graphic in question to call up a box showing formatting information (see **FIGURE 1**).

Extra: After pressing **<Shift>-<F1>**, click on any command, icon, toolbar, or other feature on Word's window to see a description of that item. Just press **<Esc>** to return the mouse pointer to its normal function.

EASY MARGIN CHANGES IN WORDPERFECT 8

WOULDN'T YOU LIKE to change the margins for a paragraph or two on the fly, without having to click through menus and open and close dialog boxes? Here's a trick that lets you skip all that rigmarole.

Start by selecting all the text that has margins you want to change. Then move the mouse pointer slowly over the dotted margin line next to the selected text. When the mouse pointer changes to a bar with a double arrow, click and drag the margin to a new location. Repeat on the other side if you want to change both margins. Click anywhere outside the selected area to continue normal editing.

RESTRUCTURE TABLES IN WORDPERFECT 8

YOU SPENT YOUR lunch hour creating a table. Now your boss wants to restructure it by combining some cells and splitting others. No problem. You can do this easily without retyping and without multiple menu commands by using new icons on the Table Property Bar. Start by clicking inside the table to display the Property Bar (see **FIGURE 2**).

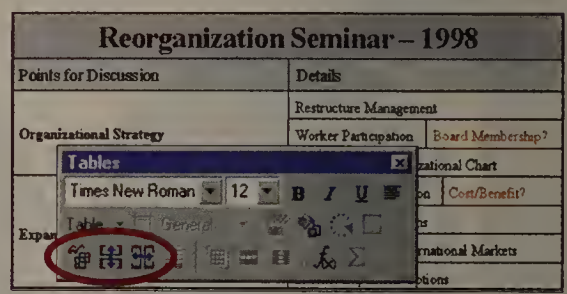

FIGURE 2: RESTRUCTURE TABLES easily with WordPerfect 8's QuickJoin and QuickSplit icons.

To join cells, click the *QuickJoin* icon on the Table Property Bar. The mouse pointer changes to an arrow with two arrows beneath it. Click and drag this pointer over the cells you want to join.

To split a row, simply click the *QuickSplit Row* icon, position the new pointer where you want the split to appear, then click.

To split a column, click the *QuickSplit Column* icon, place the new pointer where you want the split to occur, and then click again.

To return the mouse pointer to normal, click on the same icon you just used.

Word Processing *welcomes your questions and tips and pays $50 for published items. Contributing Editor George Campbell is also a contributor to* The PC Bible *(Peachpit Press, 1995, 800/283-9444). See page 14 for contact information.* ■

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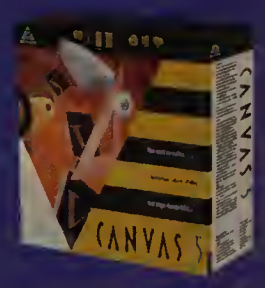

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Formulate Charts Directly in a Range

KEITH HERMANN OF Raleigh, North Carolina, sent in a clever way to create charts directly in a worksheet range using formulas. **FIGURE 1** shows an example of what you can produce with his technique. The formulas in columns E and G graphically depict monthly budget variances by displaying a series of characters in Wingdings font. The number of characters displayed is determined by an If function.

To re-create this chart in Excel, enter the data shown in columns A through D, and then enter the following formulas:

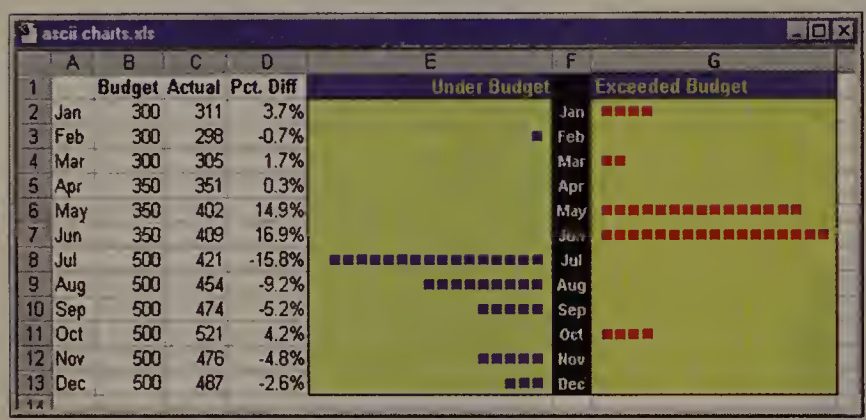
E2: **=if(D2<0,rept("n",-round(D2*100,0)),"")**

F2: **=A2**

G2: **=if(D2>0,rept("n",-round(D2*-100,0)),"")**

Assign the Wingdings font to cells E2 and G2, and then copy the formulas down the columns to accommodate all the data. Right-align the text in column E, and adjust any other formatting as you like. Depending on the numerical range of your data, you may need to change the scaling. Experiment by replacing the '100' value in the formulas. You can, of course, substitute any character you like for the *n* in the formulas to produce a different character in the chart.

This technique also works in 1-2-3 and Quattro Pro. Just use the @repeat function in place of Excel's Rept function, and insert an "at" sign (@) before the If and Round functions.

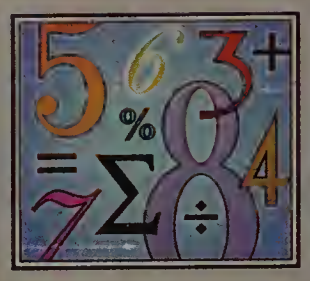


ascii charts.xls

	A	B	C	D	E	F	G
1		Budget	Actual	Pct. Diff	Under Budget		Exceeded Budget
2	Jan	300	311	3.7%		Jan	■■■■
3	Feb	300	298	-0.7%	■	Feb	
4	Mar	300	305	1.7%		Mar	■■
5	Apr	350	351	0.3%		Apr	
6	May	350	402	14.9%		May	■■■■■■■■■■■■■■■
7	Jun	350	409	16.9%		Jun	■■■■■■■■■■■■■■■■■
8	Jul	500	421	-15.8%	■■■■■■■■■■■■■■■■	Jul	
9	Aug	500	454	-9.2%	■■■■■■■■■	Aug	
10	Sep	500	474	-5.2%	■■■■■	Sep	
11	Oct	500	521	4.2%		Oct	■■■■
12	Nov	500	476	-4.8%	■■■■■	Nov	
13	Dec	500	487	-2.6%	■■■	Dec	

FIGURE 1: FORMULAS IN COLUMNS E and G (see text below) produced this chart by returning a series of Wingdings characters.

SPOT FORMULA ERRORS



WHEN YOU'RE debugging a worksheet full of formulas, you may find it helpful to see the actual formulas rather than their resulting values. Many users know that to display formulas in Excel, you select *Tools•Options*, click the *View* tab, and then place a check mark next to *Formulas* in the 'Window options' section of the dialog box. The formula display isn't really suitable for printing, however.

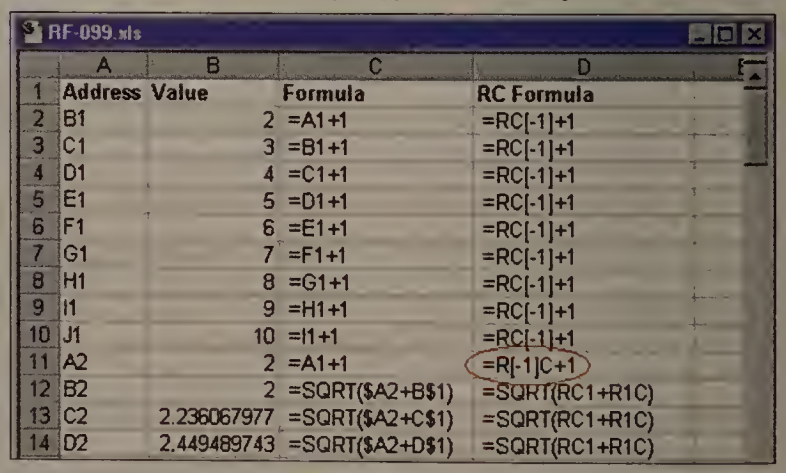
A better approach is to generate a list of all the formulas in a worksheet by using the ListFormulas VBA macro. This downloadable macro, which works in all versions of Excel, inserts a new worksheet and generates a list of all of the formulas in the active worksheet. You can then print that new worksheet to help you debug formulas in the active worksheet.

FIGURE 2 shows some sample output that is suitable for printing. The output occupies four columns: the cell address, the current value of the formula, the formula in standard Excel notation, and the formula in R1C1 notation. The R1C1 notation shows the location of a cell: The number after the *R* is the row number, and the number after the *C* is the column number. You can use this notation to compute the row and column positions in macros or to show relative cell references.

There's another reason for including the R1C1 notation: If you sort the output using column 4 as the sort key, identical formulas will appear together. This makes it easy to spot an oddball formula that's slightly different from the others—and quite likely a mistake—such as the formula in cell D11.

To use the ListFormulas macro, first download it from www.j-walk.com/ss or from PC World Online. Then open the worksheet that contains the formulas you want to list, and execute the macro.

Find files from this article on PC World Online at www.fileworld.com. Spreadsheet Tips *welcomes your questions and tips and pays $50 for published items. Contributing Editor John Walkenbach is the author of nearly two dozen spreadsheet books and maintains The Spreadsheet Page (www.j-walk.com/ss).* *See page 14 for contact information.* ■



RF-099.xls

	A	B	C	D
1	Address	Value	Formula	RC Formula
2	B1	2	=A1+1	=RC[-1]+1
3	C1	3	=B1+1	=RC[-1]+1
4	D1	4	=C1+1	=RC[-1]+1
5	E1	5	=D1+1	=RC[-1]+1
6	F1	6	=E1+1	=RC[-1]+1
7	G1	7	=F1+1	=RC[-1]+1
8	H1	8	=G1+1	=RC[-1]+1
9	I1	9	=H1+1	=RC[-1]+1
10	J1	10	=I1+1	=RC[-1]+1
11	A2	2	=A1+1	=R[-1]C+1
12	B2	2	=SQRT($A2+B$1)	=SQRT(RC1+R1C)
13	C2	2.236067977	=SQRT($A2+C$1)	=SQRT(RC1+R1C)
14	D2	2.449489743	=SQRT($A2+D$1)	=SQRT(RC1+R1C)

FIGURE 2: OUTPUT FROM THE ListFormulas macro can help you spot likely formula errors, like the one in cell D11.

Hide Sensitive Cells

MELINDA PARSONS OF Bristol, Connecticut, has found an easy way to prevent a cell from being displayed in Excel. She uses a custom number format that consists of three semicolons. To apply the format, right-click the cell and select *Format Cells*. In the Format Cells dialog box, select the *Number* tab, select *Custom* in the Category list, type three semicolons (;;;) in the Type box, and click *OK*. This method, which works in Excel 95 and Excel 97, is useful when you don't want a cell to appear on screen or in print.

ILLUSTRATION JEFFREY PELO

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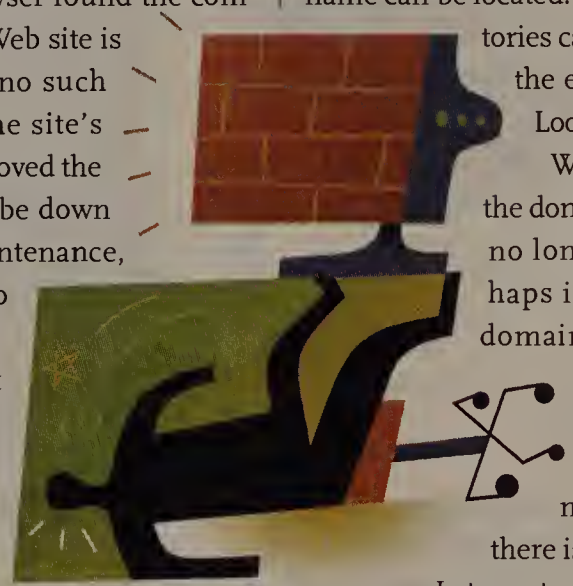
Web Error Messages and How to Handle Them

YOU'RE CLICKING through Web pages nicely when you hit a brick wall—a page with big black letters that says '404 Not Found' or some other curt message. What does that mean, and what should you do?

Here are the most common Web error messages, the problems they signal, and the most likely solutions.

'404 Not Found: The requested URL www.weebie.com/folkart/jim.html was not found on this server.'

Problem: Your browser found the computer on which the Web site is or was hosted, but no such page was found. The site's owner may have removed the page, the page may be down temporarily for maintenance, or the site may no longer exist.



Solution: Work back through the URL as if it were a directory path. For example, first try shortening the URL to 'www.weebie.com/folkart,' then to 'www.weebie.com.' You may discover that the Web site itself has disappeared.

Also, try suffixing the page's address with **.htm** or **.html** instead of its current extension. For example, in place of jim.html, type **jim.htm** (*.html* denotes the same thing as *.htm,* but some Web page hosting services require that Web pages be named with one or the other).

'DNS Lookup Failure' or 'Unable to locate the server. The server does not have a DNS entry.'

Problem: DNS stands for *domain name server.* A domain name is the first part of a URL—for example, *pcworld.com* is the domain name in *www.pcworld.com.* Every Internet service provider (including AOL) has a database of such Web page host addresses. When you type a URL, the browser tells your ISP to look up the domain name in its database. If it's not there, your ISP's computer may poll other domain name directories around the Internet to find out where the domain name can be located. If none of the directories can help, you may get the error message 'DNS Lookup Failure.'

Why can't they find the domain name? Maybe it no longer exists. Or perhaps it's so new that the domain name databases your ISP uses can't find it yet. You can also get this error message whenever there is heavy traffic on the Internet and it's taking your ISP too long to look up the name.

Solution: Try typing the URL into your browser later in the day. If you still get the error message, wait a few days and try the URL again. If you continue to receive the same message, the domain name probably no longer exists.

'No Response from Server'

Problem: Your browser can't get a timely response from the Web site's host computer. Heavy traffic on the Internet is often the culprit. Either the computer that hosts the Web site is overloaded (everyone is tapping in); your ISP is overburdened; or your ISP's computers are experiencing slowdowns for technical reasons.

Solution: Try the URL again, either in a few minutes or later in the day.

'Received Network Error'

Problem: Your ISP probably hung up on you, although this error message also occurs when glitches somewhere on the Internet have botched your file download.

Solution: Call your ISP back or start the file download again.

Take AIM, Don't Fire

AOL MESSENGER, which comes with the latest version of Netscape Navigator, is great if you want to chat over the Internet in real time with pals on America Online. But if you installed it with Navigator, only to find that you don't want it, how do you get rid of it? First, send the AIM folder to the recycling bin (look in C:/Program Files/Netscape/Communicator/Program/Aim). Then trash the AIM file in your personal Netscape user settings (go to C:/Program Files/Netscape/Users/*your name* to find the yellow icon.)

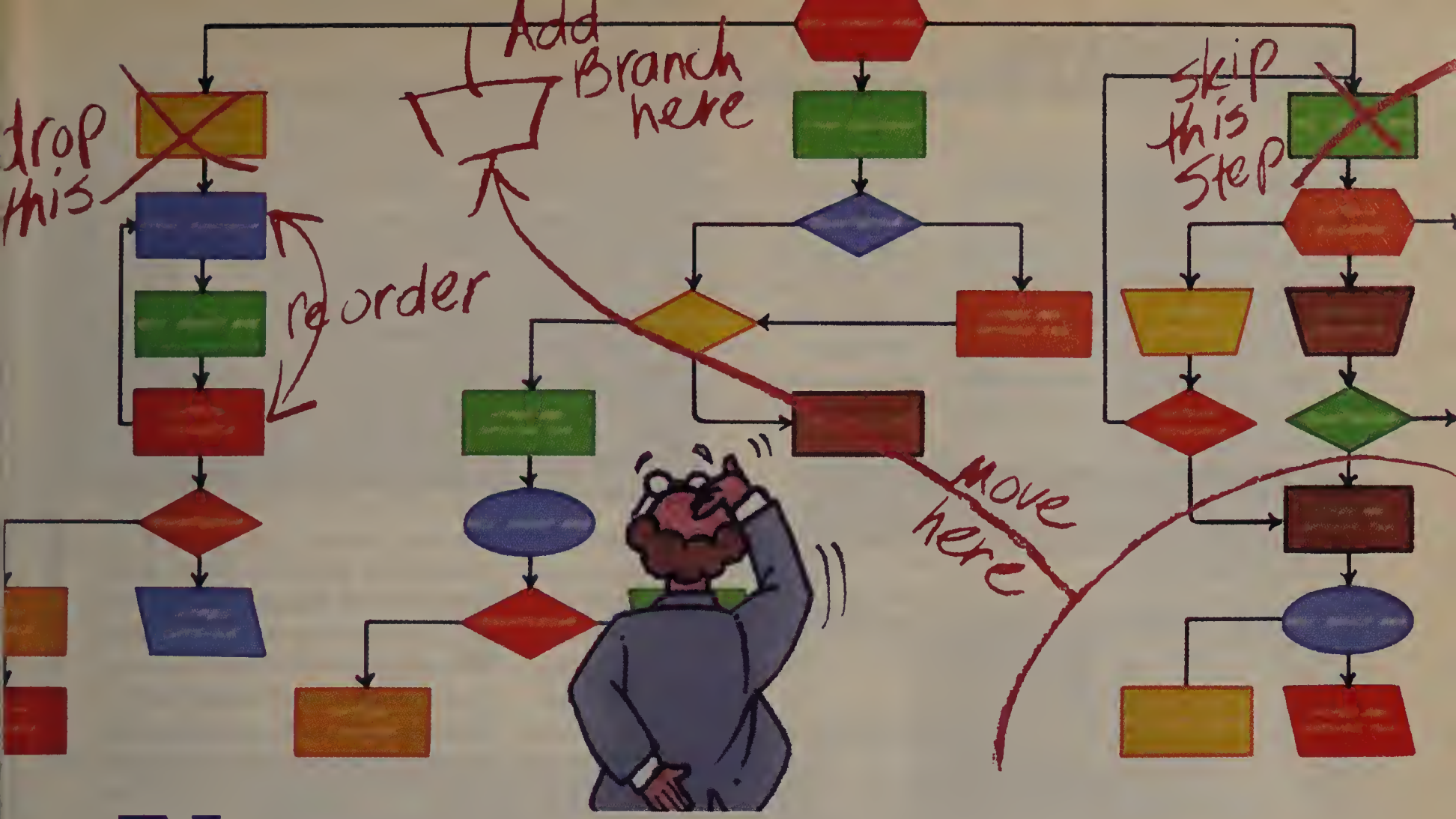
WEB SEARCHING AS EASY AS NAME-DROPPING

CARLOS GUERRERA OF Glendale, California, writes that if you select and drag two or more words from any application, like your word processor or address book, and drop it into a Web page in Navigator 4.*x*, the browser will head to one of the major Net searchers like Lycos, Excite, or Infoseek (Netscape varies the searcher used) and look for Web pages that include those words. If you drag and drop only a single word, however, Navigator will treat it like a domain name. For instance, drop *pcworld,* and Navigator will head to www.pcworld.com. This doesn't work with earlier versions of the browser, however.

MORE THAN ONE WAY TO CUT A COOKIE

OODLES OF READERS wrote in response to "Eat This Cookie—Or Else!" in March's *Internet Tips.* They all wanted to recommend Anonymous Cookie, a free cookie-blocker from Luckman Interactive (www.luckman.com). Anonymous Cookie prevents Web sites from accessing a browser's cookie file, and although it can accept cookies, it only keeps them in ▶

ILLUSTRATIONS: JEFFREY PELO (TOP); DOUG ROSS (BOTTOM)



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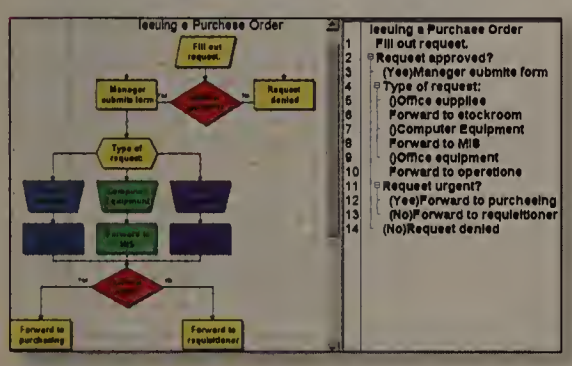

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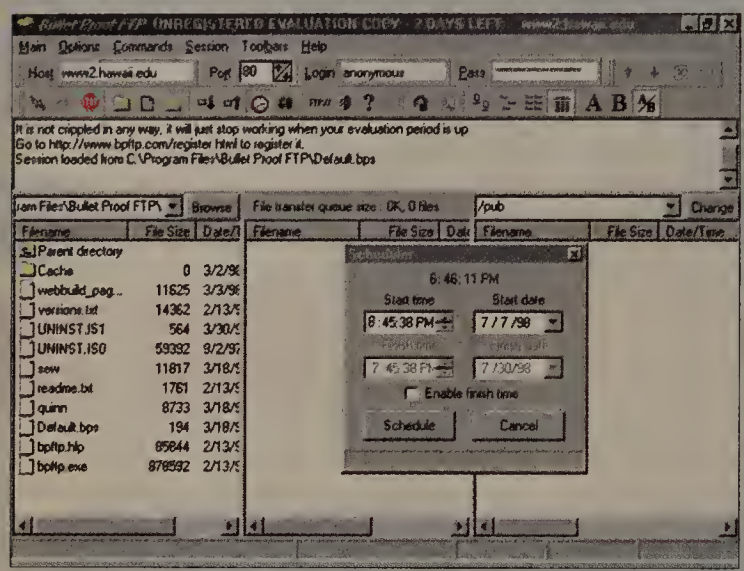
Bullet-Proof Your File Transfers

IN THE MARCH issue, I recommended the Internet download utility GoZilla. Phil Marty of Chicago has found something even better: Bullet Proof FTP (www.bpftp.com), a full-featured FTP program that resumes botched file transfers. It also offers a scheduling feature for automating transfers. At $30, Marty considers it a bargain. I do too.



TOO MANY BROWSER WINDOWS

EVEN AFTER you've disabled JavaScript, some Web sites will still spawn multiple browser windows—usually because their creators want to prevent you from leaving their site when you visit links. As Craig Lafferty of Forest Park, Illinois, complains, "When I look at my taskbar, there may be eight or nine open windows, most often loading in the background and slowing down the current window's activity."

Sorry, Craig, I can't find any way to stop these windows from opening. (But I'll bet we'll hear from our readers about this.)

memory. This means you can now navigate cookie-hungry sites without having to fight off repeated cookie requests. The cookies disappear once you've exited your browser. Anonymous Cookie works with Explorer and Navigator versions 3.0 and up for Windows 95.

QUASH POP-UP ADS

THEY'RE ONE of the Web's great annoyances: ads that pop out of a Web site in separate browser windows, making you click them out of the way. But you can stifle the pop-up ads permanently by disabling JavaScript in your browser. (Don't confuse JavaScript, a scripting tool created by Netscape, with Java, a programming language developed by Sun. The two have little to do with each other.) The only drawback is that some Web sites may become a little less interactive. Some commercial sites, for instance, use JavaScript to automate the creation of forms.

In Navigator 4.*x*, select *Edit•Preferences*, click the *Advanced* category, uncheck *Enable JavaScript*, and click *OK*.

In Navigator 3.*x*, select *Options•Network Preferences*, click the *Languages* tab, uncheck *Enable JavaScript*, and click *OK*.

In Explorer 4.*x*, select *View•Internet Options* and click the *Security* tab. Choose *Custom* and click the *Settings* button. Scroll to the Scripting category and, under Active Scripting, select *Disable* (or *Prompt* if you want Explorer to prompt you before running scripts). Click *OK*, then *Apply*.

In Explorer 3.*x*, select *View•Options*, click the *Security* tab, and uncheck the *Enable Java programs* box.

READ NEWS PAGES IN COMFORT

YOU CAN READ Web pages in Internet Explorer 4.*x* as if they were newspaper pages, easily scrolling down them. Once you've connected to a news site such as CNN (www.cnn.com), click on the *Full-screen* icon. If you later want to restore the default screen, simply click on the icon again.

BROWSER BUGS MY PRINTER

ANITA BONITA OF Westwood, New Jersey, upgraded to the Windows 3.*x* version of Netscape Navigator 4.0, but then discovered that all attempts to print to a later model HP LaserJet crashed her PC. Bonita soon remedied the problem by installing the LaserJet III printer driver and specifying the LaserJet III as the default printer in the Windows 3.*x* Print Manager before launching Netscape. Bonita recommends copying the Print Manager icon into the program group containing the Netscape icon; this helps speed up the process. After you're done with Netscape, switch back to your usual printer driver. This tactic will also work with Internet Explorer 4.0 when run under Windows 3.*x*.

Find files mentioned in this article on PC World Online (www.fileworld.com). Internet Tips *welcomes your questions and tips and pays $50 for published items. Contributing Editor Judy Heim is a coauthor of* The Quilter's Computer Companion *(No Starch Press, 1997, 800/420-7240).* *See page 14 for contact information.* ■

PC WORLD ONLINE SEARCHING TIPS

PC World's Web site contains a vast collection of news stories, hardware and software reviews, and downloadable files. Here's how to find what you're looking for.

How do I find shareware or freeware recommended in *PC World*?	Click *FileWorld* under the *PC World* logo, type the name of the program in the Search FileWorld box, then click *Search*. If your search doesn't yield the right results, browse the Categories list.
How do I find hardware and software recommendations?	Click *Top 400 Products* (under the *PC World* logo) or *Interactive Buyer's Guide* (in the lower-right corner of the page), or type the product name in the Search PC World box and click *Search*.
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How do I search for specific information?	Click *Search PC World* and type in a word or phrase. You can include or exclude words by prefacing them with pluses or minuses. For instance, type **"financial software" -tax** to search for financial software excluding tax software.

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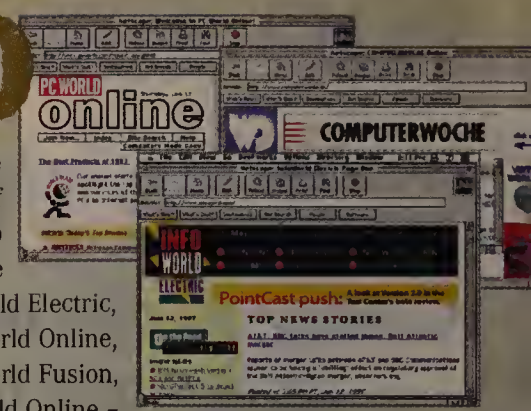

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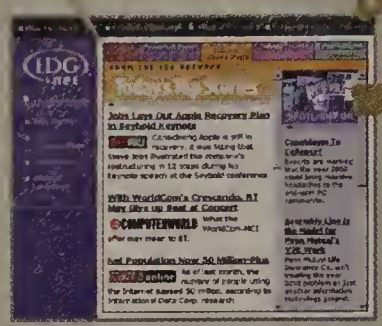

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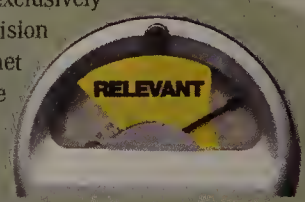

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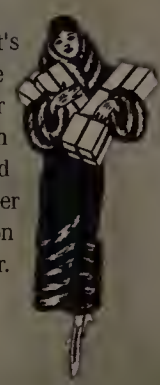

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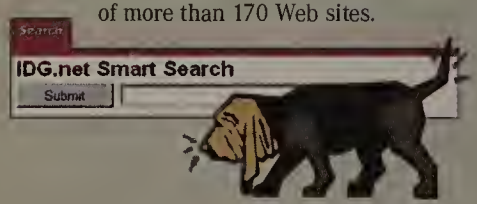

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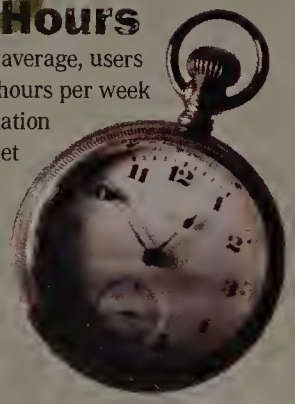

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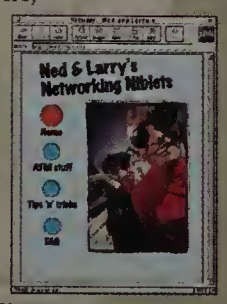

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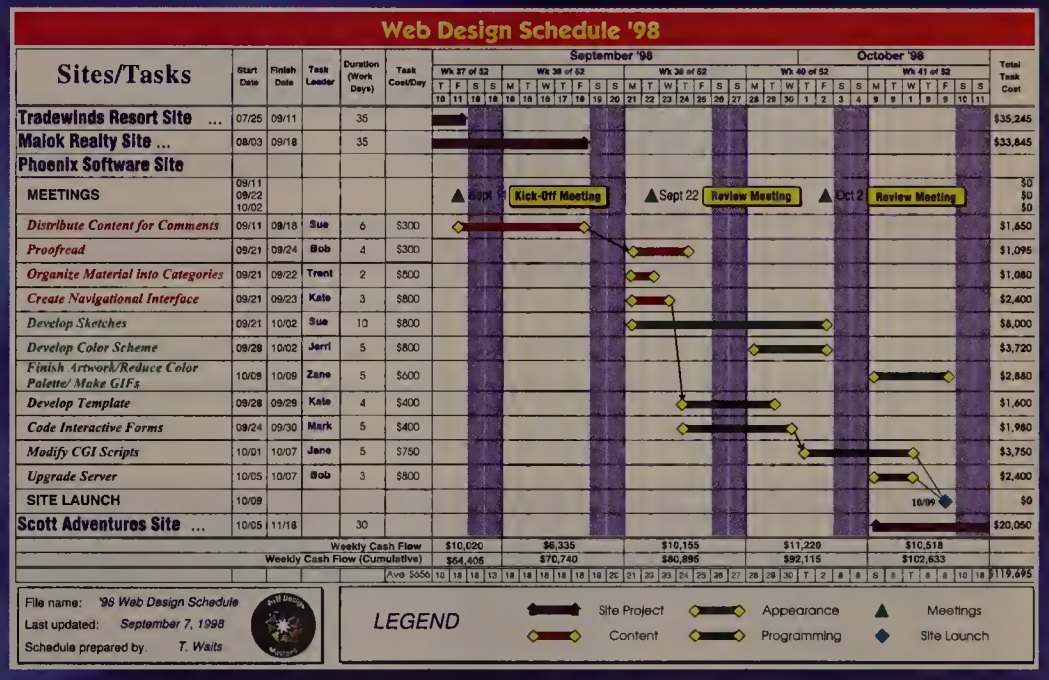

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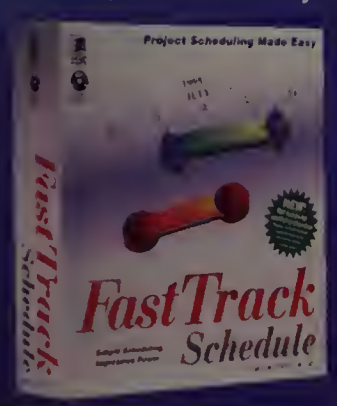

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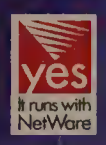

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Moving Windows 95 to another hard drive ◆ Backing up key files and information

Fix Intolerable Problems by Reformatting Your Drive

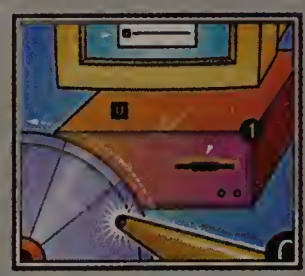
YOU'VE TRIED EVERYTHING—running diagnostic utilities, replacing key files, even playing Bach sonatas to your PC. But it still suffers from at least one unbearable problem. When the damage is too deep or obscure to correct by merely fiddling around, it's time to clean off your hard disk and reinstall everything.

A CLEAN SLATE

TO START FRESH, you can't just delete and then reinstall Windows 95 and all your software. Persistent PC problems sometimes stem from a damaged File Allocation Table (the table of contents that Windows 95 uses to locate files or specify damaged sectors on your hard disk). ScanDisk or a similar disk utility will let you know when your FAT's in the fire: Clues include problems with file names or folder names that can't be fixed by running ScanDisk, and files or folders that won't open or can't be deleted.

To fix such problems, you reformat the disk—either physically (a low-level format) or logically (a high-level format).

A low-level format (first done at the factory) draws magnetic lines on the hard disk. Fortunately, these days you rarely need to redo a low-level format.



A high-level format creates a new FAT and scans the surface of the disk, finding and marking damaged sectors (those that won't hold data). Performing a high-level format is deceptively easy; simply run format.com in DOS or the Format utility (by right-clicking the drive icon in Windows 95 Explorer). But this wipes out everything on your drive; so before you try it, make sure you're out of other options.

LAST-DITCH EFFORT

HERE'S ONE FINAL alternative: Try moving your current installation of Windows 95 and other software to another hard disk (if you have one) or to a second partition on your current hard disk. Of course, the partition or second hard disk must have enough free space to hold all your files. Once you've done this, you can reformat the suspect partition and use it again. You can even move the operating system and your files back to the original partition.

To resize an existing partition or create a new partition without losing any data, use a utility like Partition Magic or Partition-It Extra Strength. Make the new partition a primary (not a logical) partition, since only primary partitions are bootable.

The next step is to make the target partition or second hard disk bootable. First, add the system files by opening a DOS box and typing **sys d:** (or the correct drive letter). Now set the target partition as the active, or boot, partition, using the DOS FDISK command (see the May *Hardware Tips*) or a utility like Partition Magic. ▶

When Your Screen's a Shade Off

IF EVERYTHING ON your screen suddenly turns blue, green, or red, look carefully at the connection between your monitor and your PC. If the color changes when you jiggle the cable, try checking the connectors, closely examining the pins. If a single pin is bent or pushed in, *very gently* straighten it or pull it out with a small pair of needle-nose pliers. If your connector looks good, try *gently* jiggling the cable every few inches. If you find a bad spot, use electrical tape and a toothpick to create a splint at that spot.

ILLUSTRATION: JEFFREY PELO

PUT YOUR DOS CD-ROM DRIVERS ON A FLOPPY

Steps	Helpful hints
1. Find mscdex.exe on the hard disk and copy it to the floppy.	Use the Find command (in Explorer, press <F3>) or check for the path in the command line in the hard disk's autoexec.bat file, if present.
2. Copy the mscdex.exe command line from the hard disk's autoexec.bat to the floppy's autoexec.bat.	Example: C:\WINDOWS\COMMAND\MSCDEX /D:MSCD001 Autoexec.bat is in the root directory. Open it with Notepad or any editor.
3. Adjust the path in the floppy's command line.	Example: A:\MSCDEX /D:MSCD001 Change only the path, leaving other parameters the same.
4. Find the CD-ROM drivers on the hard disk and copy them to the floppy.	Open the config.sys file in your hard disk's root directory and examine the command line for the location of the drivers on the hard disk. See the example below. Alternatively, they may be on a floppy disk that came with your PC.
5. Copy the CD-ROM driver's command line from the hard disk's config.sys to the floppy's config.sys.	Example: DEVICE=C:\CDROM\NEC_IDE.SYS /D:MSCD001 Config.sys is in the root directory. Open it with Notepad or any editor.
6. Adjust the path in the floppy's command line.	Example: DEVICE=A:\NEC_IDE.SYS /D:MSCD001 Change only the path, leaving other parameters the same.

FIGURE 1: TO REINSTALL WINDOWS 95 from a CD-ROM, you must first create a floppy disk that will enable the CD-ROM to work properly.

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Finally, copy all but one of the files to the new partition, including those marked as hidden. (The exception is win386.swp, the swap file.) Go to Explorer and select *Show all files* under *View•Options* (or *View•File Options* with Internet Explorer 4.0 or Windows 98). Then select the Windows folder in Explorer, and hit **<Ctrl>-A** to select everything. Run down the left window, and find win386.swp; deselect it by holding down **<Ctrl>** and clicking the file name. Now copy everything else to the target partition.

Repeat this process to copy all the other files and folders, making sure that you deselect the Windows folder you just copied. If the target partition is on the same drive as the original partition, you should be able to restart, and Windows will load from the new partition. If you've copied Windows to a second hard drive, you must swap the connections on the two drives and possibly also switch their master/slave jumpers.

DON'T BURN YOUR BRIDGES

PARTITIONING WON'T do it? Okay, time to reformat your entire drive.

This will blow away all the data that's stored there, so save everything you need:

Windows 95 installation files. Make sure you've still got your Windows 95 CD or floppies. And find the correct registration number; Windows 95 setup will ask you for it. It's usually posted on a green certificate that comes shrink-wrapped with the Windows 95 manual.

If you purchased the upgrade version of Windows 95 and installed it over Windows 3.*x* or DOS, you'll need your old program disks as well.

Configuration files and drivers. Back up the old DOS and Windows 3.*x* configuration files: autoexec.bat, config.sys, win.ini, and system.ini. When you reinstall Windows 95, the software will install the appropriate Windows 95 drivers.

But older devices in your PC may be running on older DOS or Windows 3.*x* drivers. If you find that your PC is using an older driver for a certain component, this is a good time to check with Microsoft or the component manufacturer to see if a new Windows 95 driver has been written since your last Windows 95 installation. Updating drivers is usually a good idea—especially if the upgrade involves switching from a DOS driver to a Win 95 driver.

If you do have to reuse your old drivers, make sure you back up the actual driver files as well as the configuration files that launch them. To be safe, back up all the files in a driver's folder, not just the file named in the configuration file. That goes for any hardware you installed after installing Windows 95. If you don't have the disks, hunt for the files on the hard drive.

Windows 95 Startup Disk. This is a bootable floppy with all the utilities you'll need to reformat your hard disk. In Control Panel, double-click the *Add/Remove Programs* icon, click the *Startup Disk* tab, and then click the *Create Disk* button to make the disk. In addition, you'll want copies of DOS's xcopy32.exe and xcopy.exe files.

If you plan to reinstall Windows 95 from a CD-ROM, you need a copy of your PC's DOS CD-ROM drivers on the Startup Disk, plus copies of autoexec.bat and config.sys with the command lines that call those drivers (see **FIGURE 1**). If you don't have those last two files, search your hard disk for **auto*** and **config***.

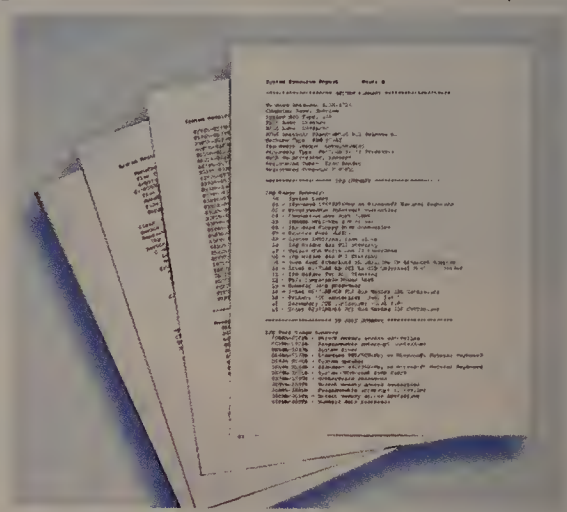

FIGURE 2: A SYSTEM RESOURCE REPORT helps pinpoint the drivers you must back up.

Application software installation materials. As with Windows 95, you should have all the installation disks or CD-ROMs and all required serial numbers at your fingertips. Don't forget to copy any software you've downloaded from the Internet, too.

All files you want to save. Back up your data to another hard drive, a network file server, a Zip drive, or another PC via your parallel port—or in the worst case, in compressed form to floppies.

Anything else of value. Once it's gone, it's gone. So back up *anything* you might someday regret losing—including crucial settings information. If the PC is on a network, record all your network parameters (double-click the *Network* icon in Control Panel). If you do Dial-Up Networking, write down all the Connection settings. And for good measure, crank out a system resource report (see **FIGURE 2**) and look it over for files you may have missed. (To make a printout, go to Device Manager, click the *Print* button at the bottom of the screen, and under Report Type select *All devices and system summary.*)

GO FORMAT

BEFORE YOU RUN the format command, reboot from the Windows 95 Startup disk. At the A:/> prompt, confirm that your DOS CD-ROM drivers are properly installed by putting a CD-ROM in the drive and typing **dir d:** (or whatever drive letter is correct). A list of the CD-ROM's files should appear.

To format your disk—or the partition where you plan to reinstall Windows 95—type **format c: /s** and press **<Enter>.** (Substitute the correct drive letter for "c:" if appropriate.) The "/s" will copy all the system files necessary to make the drive/partition bootable and ready for Windows 95 installation.

Insert the Windows 95 CD-ROM, type **d:\setup** (substituting your CD-ROM drive letter), and press **<Enter>.** The installation program will launch at once. Windows 95 will poll all your hardware and install drivers from the CD-ROM. Once Windows is running, you can install more recent drivers—or hardware Windows 95 didn't recognize—by double-clicking the *Add/Remove Hardware* icon in Control Panel.

- **Partition Magic; $70 list; PowerQuest; 800/379-2566; www.powerquest.com**

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- **Partition-It Extra Strength; $60 list; Quarterdeck; 800/683-6696; www.quarterdeck.com**

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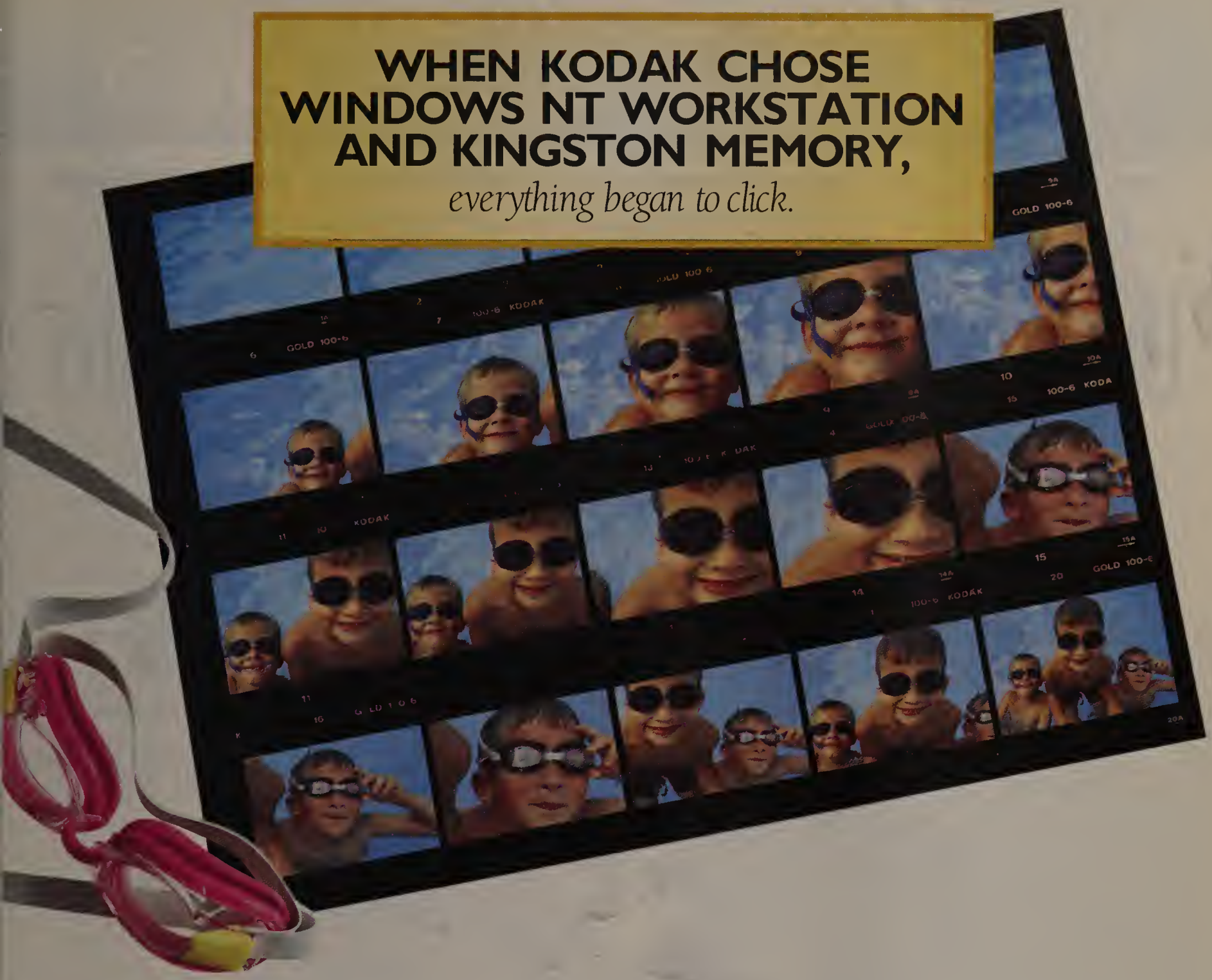
Hardware Tips *welcomes your questions and pays $50 for published items. Kirk Steers is a* PC World *contributing editor.* *See page 14 for contact information.* ■

WHEN KODAK CHOSE WINDOWS NT WORKSTATION AND KINGSTON MEMORY,

everything began to click.



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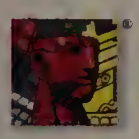

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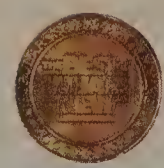
Best Of The Year
Video Magazine, January 1998



"Remarkable...blurs the line between video and still cameras."

Best Of What's New
Popular Science, December 1997

"...it's a combination DV camcorder and digital still camera."

Golden Plug Award
E/Town, August 1997

"Input device of the year."

Hyper Award
New Media, March 1998

The Playback On This Digital Camcorder Is Nothing Short Of Stellar.

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Guy Tech Awards
GQ, December 1997

"Editors' Choice."

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Finalist Award, Macworld, March 1998

"Top Pick-Digital Camcorder."

Editor's Choice Award
Petersen's Photographic, April 1998

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Editor's Choice
PC Graphics & Video, December 1997

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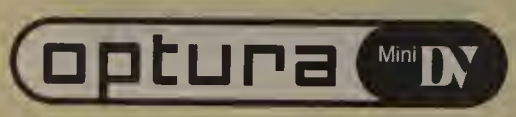

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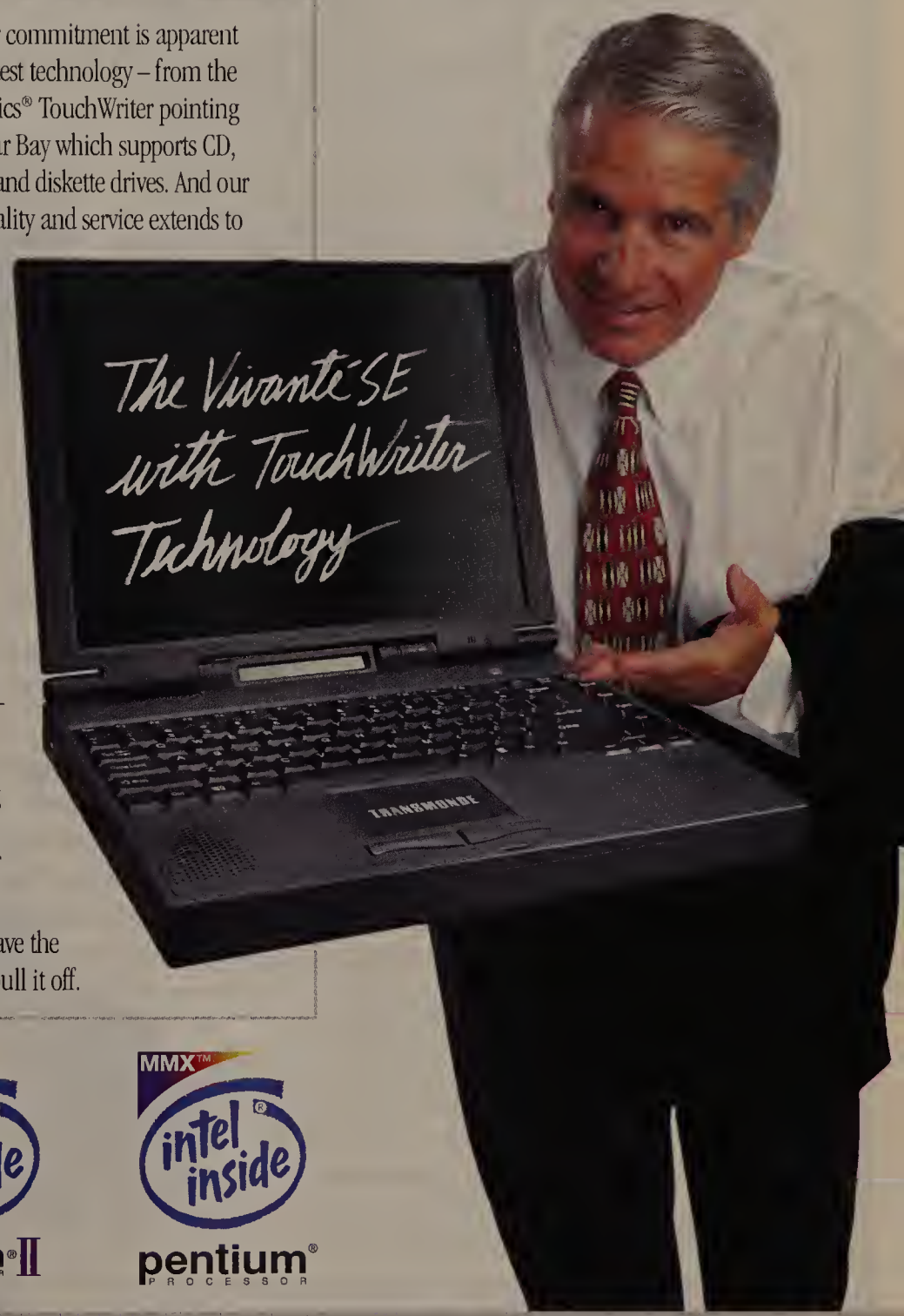

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YOUR QUESTIONS ON: Automatically deleting files ◆ Locking the CD-ROM drive

Should I Worry About My PC Becoming Obsolete?

I'M PLANNING TO buy a Pentium II, but I understand that by 1999 these processors will be up to 800 MHz. Will my computer be out of date that fast?

Kristopher Matthews
Arroyo Grande, California

THE PENTIUM II LINE won't hit the 800-MHz mark before the end of next year, but that doesn't change my answer.

If by "out of date" you mean anything less than the latest, greatest machine, *any* PC you buy now will be out of date by the year 2000. And if you wait a year to buy the latest, greatest machine, that one will be out of date by 2001. The cold truth: When it comes to hot equipment bragging rights, PCs have a shorter life span than teens' sports shoes.

On the other hand, if you buy a PC to do a certain job, and it does that job at a reasonable speed, it's not out of date. Common tasks like word processing, e-mail, and Web surfing don't require today's fastest PCs. I'm happy using the Pentium-133 I bought two years ago.

Even for 2D animation, there's little noticeable improvement.

But 3D modeling is another story. If you use a CAD program extensively or are so hopelessly addicted to computer games that you're willing to pay hundreds of dollars for quality playtime, you need the fastest processor available. Even so, having a serviceable computer on your desk today makes more sense than planning to buy a somewhat better one next year.

The surest way to render your computer obsolete is to upgrade your software. New versions almost always run slower than the older ones, even when they promise to be faster. Hence, Spector's Law: The market for ever-faster hardware is driven by ever-slower software.

AN OUTLOOK ON TIME ZONES

AS A NEW YORKER, I naturally view Manhattan as the center of the world, so I was surprised to find that my new computer came set to Pacific time. When I changed Windows' time zone setting, Outlook obligingly moved all my appointments forward three hours. Short of reentering every appointment where it should be, how can I change time zones and still keep my appointments?

Phil Bentley, Floral Park, New York

WELL, YOU could move to California. But on second thought, it's already crowded here, so let's fix the problem instead.

The first thing you should do is change the time zone back to where it was. That way, all your appointments will be correct, even if your place in the world isn't. Double-click the time at the right edge of the taskbar, click the *Time Zone* tab, select *(GMT-08:00) Pacific Time (US & Canada); Tijuana*, and click *OK*.

Regrettably, the rest is trickier. Outlook's designers evidently think that the world revolves around Redmond, Washington. Hang on to your keyboard, it's going to be a bumpy ride.

1. Export the calendar data to a text file. In Outlook, select *File•Import and Export*. In the resulting wizard, choose *Export to a file* and click *Next* (see **FIGURE 1**). Select *Calendar* and click *Next*. Select *Tab Separated Values (Windows)* and click *Next*. (In Outlook 98 these two steps are reversed: You select *Tab Separated Values;* and on the next page, *Calendar*.) Enter a file name, then click *Next* and *Finish*. Enter a date range or accept the default (remember, you'll lose all appointments before and after the range). Click *OK*. Exit Outlook.

2. Change your time zone. Double-click the time at the right edge of the Windows taskbar, click the *Time Zone* tab, select your time zone, and click *OK*. ▶

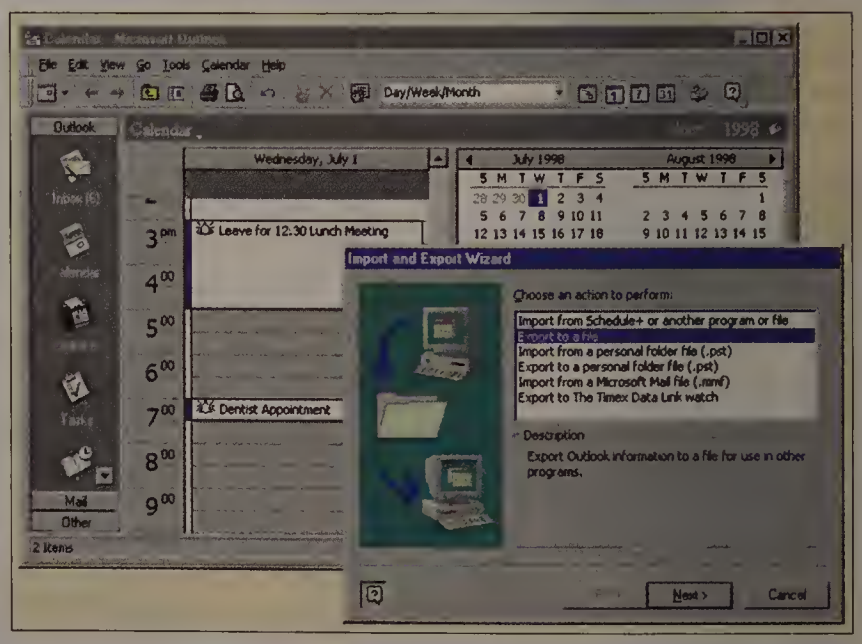
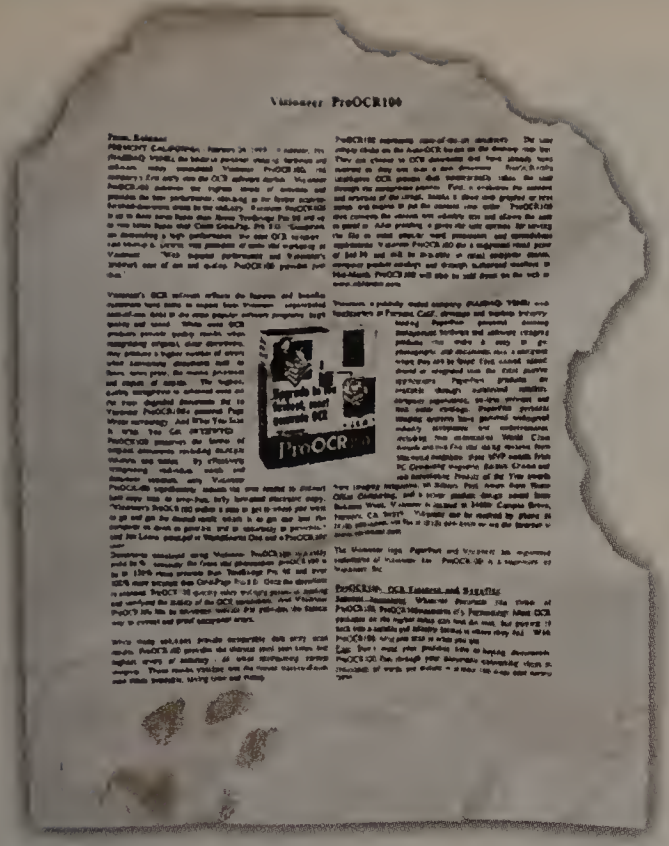


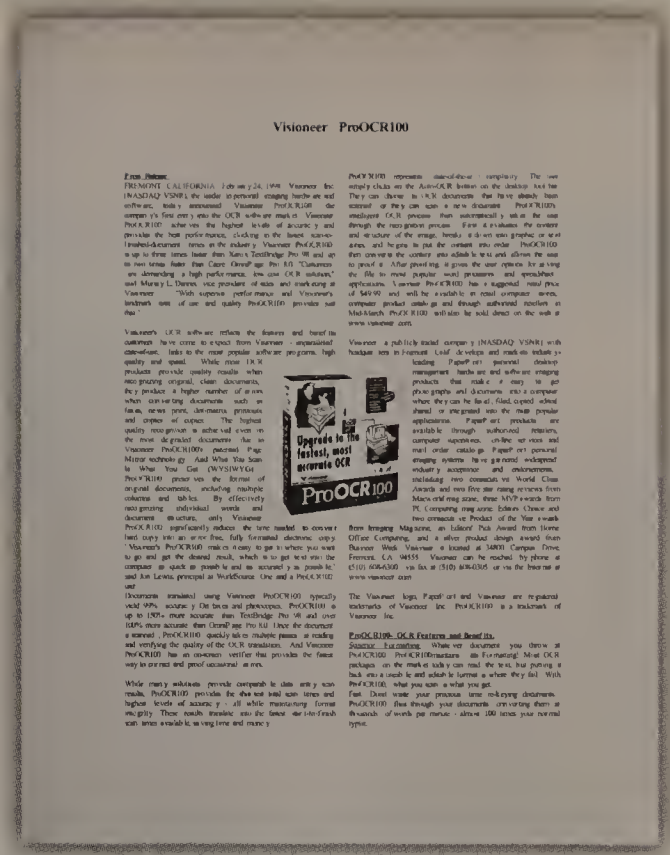
FIGURE 1: CHANGING YOUR TIME ZONE wreaks havoc in Outlook. Only repeated visits to the Import and Export Wizard can fix the problem.

Sewing a Thread of Messages in Outlook Express

YOUR INBOX IS jammed, and you need to find all the responses to a particular message—say 'Blackmailing the CEO'. Click the *Subject* bar in the Inbox window to alphabetize messages by subject, and thereby group all messages with the same subject. Outlook Express will ignore prefaces such as 'Re:' and 'Fw:', so 'Blackmailing the CEO', 'Re: Blackmailing the CEO', and 'Fw: Blackmailing the CEO' will be grouped together.

ILLUSTRATIONS: JEFFREY PELO (TOP); DOUG ROSS (BOTTOM)





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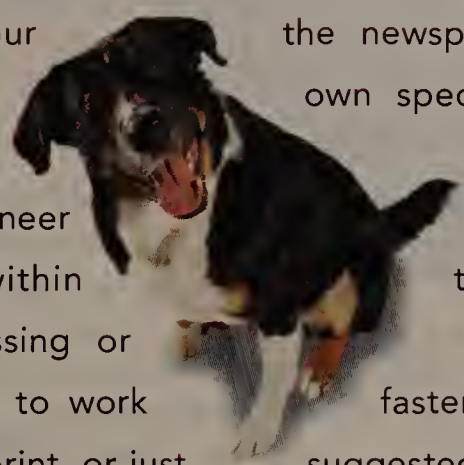

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Circle 255 on reader service card

3. Find and rename your Outlook data file. Many factors affect the exact name and location of the Outlook data file, including whether you share your computer with others and whether you have ever used Exchange or Schedule+. But the file's extension is .pst, so search for that: From the *Start* button, select *Find•Files or Folders*. In the Named field, type ***.pst**, then press **<Enter>**. If only one file turns up, that's the file you want. If more than one file appears, pick the one with the latest date—or with your name. Rename the file, keeping the .pst extension.

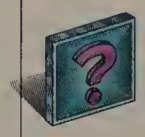
4. Start fresh in Outlook. Launch Outlook. An error message will tell you the .pst file is missing and ask permission to create another one. Grant permission, and accept the defaults to any other questions it asks you. When it asks for the name of the new file, accept the default. *Don't* give it the new name you gave the old file. Outlook should then display no information.

5. Bring back your appointments. Select *File•Import and Export*. In the wizard, select *Import from Schedule+ or another program or file* (or in Outlook 98, choose *Import from another program or file*) and click *Next*. Pick *Tab Separated Values (Windows)* and click *Next*. If the next page's 'File to import' field doesn't contain the name of the text file you created in step 1, click the *Browse* button, find and highlight that file, and click *OK*. Click *Next*. Select *Calendar* and again click *Next*. Then click *Finish*.

6. Bring back other data. Now you have your appointments where you want them, but everything else you entered into Outlook (like e-mail and tasks) is gone. To restore the contents of your e-mail in-box, select *File•Import and Export*. Select *Import from a personal folder file (.pst)* and click *Next*. (In Outlook 98, pick *Import from another program or file*, click *Next*, choose *Personal Folder File (.pst)*, and click *Next* again.) Click *Browse*, select the original file you've renamed, and click *Open*. Click *Next*. At the next page, select *Inbox*, then click *Finish*.

7. Bring back the rest. Nope, you're not done with that wizard yet. Repeat step 5 for every section of Outlook where you've been storing data—except, of course, the Calendar. If you're not sure what to keep, go through every option except Deleted Items (which you can probably do without). Unfortunately, you can't select more than one section at a time.

AUTOMATICALLY CONFIRM YOUR DELETES



EVERY DAY, I RUN A batch file with the command del *.* to clean out certain directories. The problem is, I have to answer "Y" to each Delete command when DOS wants to know if I'm sure I want to get rid of the files. Is there a way to empty a directory without confirming it?

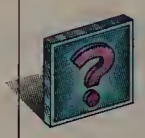
Bruce Taszarek, Pittsburgh

YES, BUT FIRST YOU NEED to create a file to give the Delete command the okay it wants. Launch Notepad, type **y**, and press **<Enter>**. Save the file in your C:\Windows\Command folder as **y.txt**. (This file must contain only the letter *y* and one carriage return.)

In your batch file, change each 'del c:\windows\temp*.*' line to instead read as **del c:\windows\temp*.* < c:\windows\ command\y.txt**.

That's all there is to it. From now on, your batch file will empty folders automatically—without a second thought.

STOPPING CD-ROM ENTRY



HOW CAN I lock the CD-ROM drive when Windows 95's screen saver is on? The screen saver's password protection keeps people off my desktop, but if someone inserts a CD into the drive, the autoplay feature can cause problems.

Norman Kay, Tucson, Arizona

IT'S AMAZING WHAT we have to do to keep other people off our computers.

A CD-ROM's autoplay won't override a screen saver's password protection, but it can launch a program behind the scenes.

The best solution is to turn off autoplay: Right-click *My Computer* and select *Properties*. Click the *Device Manager* tab and then the + next to 'CDROM.' Select your CD-ROM drive, click the *Properties* button at the bottom of the dialog box, click the *Settings* tab, and uncheck *Auto insert notification*. Click *OK* twice, and then *Yes*.

The problem with this method is that after you reboot, neither CD-ROMs nor audio CDs will start automatically—even when *you* put them in the drive. But you can create an icon to get back at least some of the lost convenience: Double-click *My Computer*. Right-click and drag the CD-ROM drive icon to either the desktop or the Start button, and select *Create Shortcut(s) Here*. Double-clicking this icon (or selecting it on the Start menu) will autoplay whatever CD is in the drive.

THE COLOR OF RAM

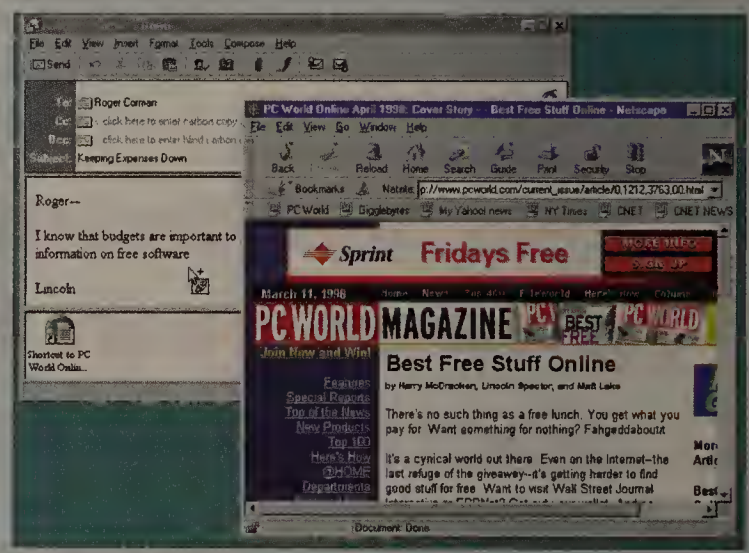
HOW MUCH video memory do I need to run 16-bit or 24-bit High Color in Windows 95? These settings aren't offered as options on the Display Properties dialog box's Settings tab [accessible by right-clicking the desktop and selecting *Properties*]. I have a 4-year-old system with only 512KB of video memory.

Wayne Shannon, Post Falls, Idaho ▶

From Navigator to Anywhere

WANT TO RECOMMEND a particular Web page to a friend? Looking for a way to reference a URL in a document or worksheet? If the application supports OLE, Netscape Navigator 4.*x* makes this process a matter of dragging and dropping.

Make sure both your Navigator window and the target application appear on the screen. Then drag Navigator's Page Proxy icon (the one to the left of the URL on the location toolbar) to the target location. Depending on the application you drag it to, you will get either the URL as text, or—as in the Outlook Express example shown here—an Internet link file embedded in the document.



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TO CALCULATE how much video memory you need, you must know the color depth and the screen's horizontal and vertical resolution in pixels. Here's the formula: Minimum video memory = HR x VR x CD ÷ 8,388,608, where HR is the horizontal resolution, VR is the vertical resolution, and CD is the color depth. Okay, a bit more explanation:

Horizontal resolution (the number of pixels in a line across the screen) and vertical resolution (the number of horizontal lines on the screen) are the numbers used to describe screen resolution, such as 640 by 480, 800 by 600, or 1024 by 768. Multiplying them together yields the number of pixels displayed at a given resolution.

Color depth is the number of bits needed to support a certain number of colors. For instance, you need 8 bits to produce 256 colors ($2^8 = 256$). Windows' High Color can display 65,536 colors; it uses 16 bits ($2^{16} = 65{,}536$). To calculate the number of bits for an entire screen, simply multiply the screen resolution (number of pixels) by the color depth.

Why divide by 8,388,608? Because video cards advertise their video memory in megabytes, and 1MB has 8,388,608 bits (8 bits in a byte times 1024 bytes in 1 kilobyte times 1024 kilobytes in 1MB).

The resulting number is the minimum amount of video memory you need to support that combination of resolution and color depth (see **FIGURE 2**). Of course, extra video memory doesn't hurt. It can be used to cache images for quick redisplay and improve video performance.

As for your PC, Wayne, bad news: Its 512KB of video memory can't handle 16-bit High Color, even at 640 by 480. The best it can support is 800 by 600 with 256 colors or 1024 by 768 with 16 colors.

HOW MUCH VIDEO MEMORY DO YOU NEED?

RESOLUTION	256 colors (8-bit color depth)	65,536 colors (16-bit color depth)	16,777,216 colors (24-bit color depth)
640 by 480	1MB	1MB	2MB
800 by 600	1MB	2MB	2MB
1024 by 768	2MB	2MB	4MB
1280 by 1024	2MB	4MB	4MB

FIGURE 2: SCREEN RESOLUTION AND COLOR depth dictate how much video memory you need.

Answer Line *welcomes your questions and pays $50 for published items. Lincoln Spector is a contributing editor for* PC World. *See page 14 for contact information.* ■

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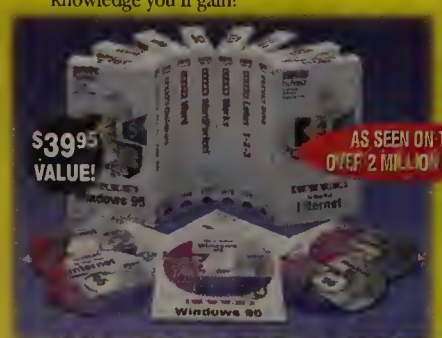

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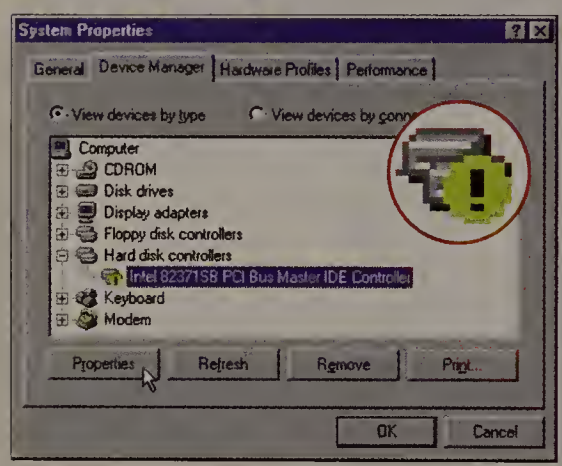
Be First on Your Block With DVD

IN AN INDUSTRY filled with hype, nothing tops Digital Versatile Disc. A disc that looks like any CD-ROM holds gigabytes of data, letting you run ultra-high-quality motion pictures, incredibly realistic games, or data-rich programs.

Surprisingly, we're on the brink of this bliss. The latest DVD drives have largely eliminated the performance and compatibility problems of early drives. Prices of DVD upgrade kits have dropped to the $350–$500 range. And normal folks can (with patience) carry out the installation.

The path to nirvana isn't complete, though, since DVD applications are still hard to come by. Oh, you can find hundreds of DVD movies at your local Circuit City, and they work just fine in PC-based DVD drives and deliver video and sound that's stunningly better than videotapes. You also can find some impressive games. But if you want to use your PC for something other than games or movies, you'll have to be patient. Few applications are available now, but many consumer titles are expected by this holiday season.

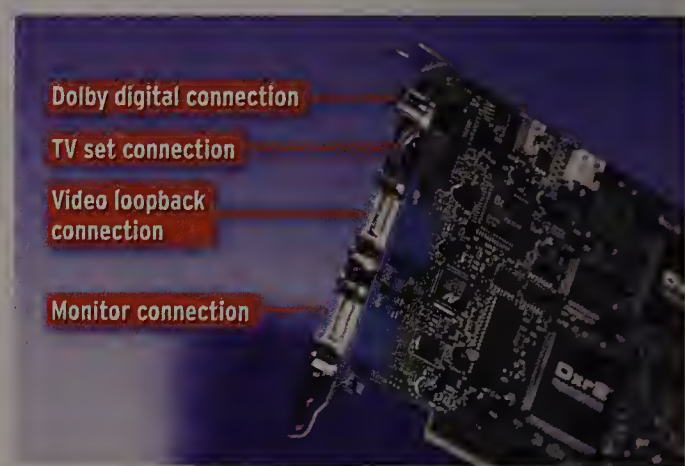
1 Check your PC. Make sure your PC is completely trouble-free before you start; even minor incompatibilities that never gave you grief before can sabotage your DVD installation. Select *Start•Settings•Control Panel*, double-click the *System* icon, and click the *Device Manager* tab. If you see exclamation points next to any of the device entries, select *Start•Help•Find*, search for Help's hardware troubleshooter, and follow the directions given there.



Because installing a DVD drive will substantially change your software and hardware settings, do a complete backup of your PC.

Then select *Start•Settings•Control Panel*, double-click the *Display* icon, click the *Settings* tab, and set your display to 800 by 600 dpi and high color (16-bit).

2 Install the MPEG board. Turn off your PC and remove the cover. Find a free PCI expansion slot and remove the metal slot-cover plate behind it. Ground yourself by touching the case. Unplug the PC. Then carefully insert the MPEG card into the slot, and secure it with the screw you removed when you took off the slot-cover plate.

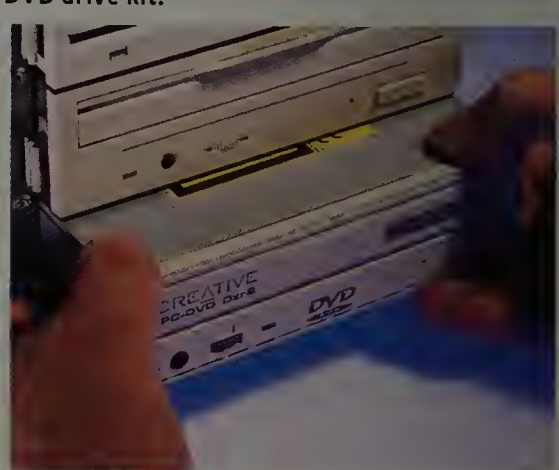


3 Install and hook up the drive. If your PC has both a hard drive and a CD-ROM drive, the hard drive is probably hooked up to the primary EIDE connector on the motherboard, and the CD-ROM drive to the secondary EIDE connector. If this is so, set the DVD drive jumper to "slave" and hook it up to the extra connector on the wide data cable that goes to the hard drive. Don't use the extra connector on the cable that's hooked up to the CD-ROM drive; if you do, the DVD drive won't work at full speed. Make sure that your hard drive jumpers are set to "master" (this might require removing the drive). Jumper settings are usually labeled on the drive. If they're not, consult your manual.

If both your hard drive and your CD-ROM drive are on a single data cable connected to the primary EIDE connector, use the secondary connector for the DVD drive. Set the DVD jumper to "master" and use the data cable that came with your DVD kit to attach the drive to the motherboard EIDE connector.

Plug the power cable into the DVD drive. You may need to use a Y-connector if your PC doesn't contain extra power connectors.

Install the DVD drive into a 5.25-inch drive bay. Some cases require special rails; with others you just secure the drive in the bay by using screws supplied in the DVD drive kit.



PHOTOGRAPHS: KEVIN CANDLAND

You can get DVD drive kits from any of several sources, including Creative Labs (www.soundblaster.com), Diamond Multimedia (www.diamondmm.com), Hi-Val (www.hival.com), and Sony (www.sony.com/storagebysony). A leading example is the Creative Labs PC-DVD Encore (shown below), which handles the current generation of 4.7GB discs and produces full-screen, high-resolution MPEG-2 video that you can view on your PC monitor or, for best quality, on an external TV monitor. You can also connect it to a Dolby Digital receiver for ultimate sound. The Encore reads CD-ROMs at speeds up to 20X and works with discs made by CD-Recordable drives (earlier DVD drives didn't).

DVDs demand powerful systems, with a Pentium-133 or faster CPU; Windows 95; a minimum 16MB of memory (32MB for some kits); a graphics card that displays at least 800 by 600 dots per inch with 16-bit color; a PCI slot; a Sound Blaster or compatible sound card; a 5.25-inch drive bay; and an EIDE connector.

Early DVD kits thoroughly earned their reputation for difficult installation. And installing a DVD drive remains far more complicated than setting up a CD-ROM drive. You install not just the drive, but an MPEG add-in card to decompress DVD video. You also have to deal with a tangle of cables for interconnecting the drive, MPEG card, audio card, graphics card, and (optionally) external television monitor or surround stereo system. But Plug and Play MPEG cards and improved software are making the job easier. If you want your DVD now, here's how to get it.

Stan Miastkowski is a PC World *contributing editor.* ■

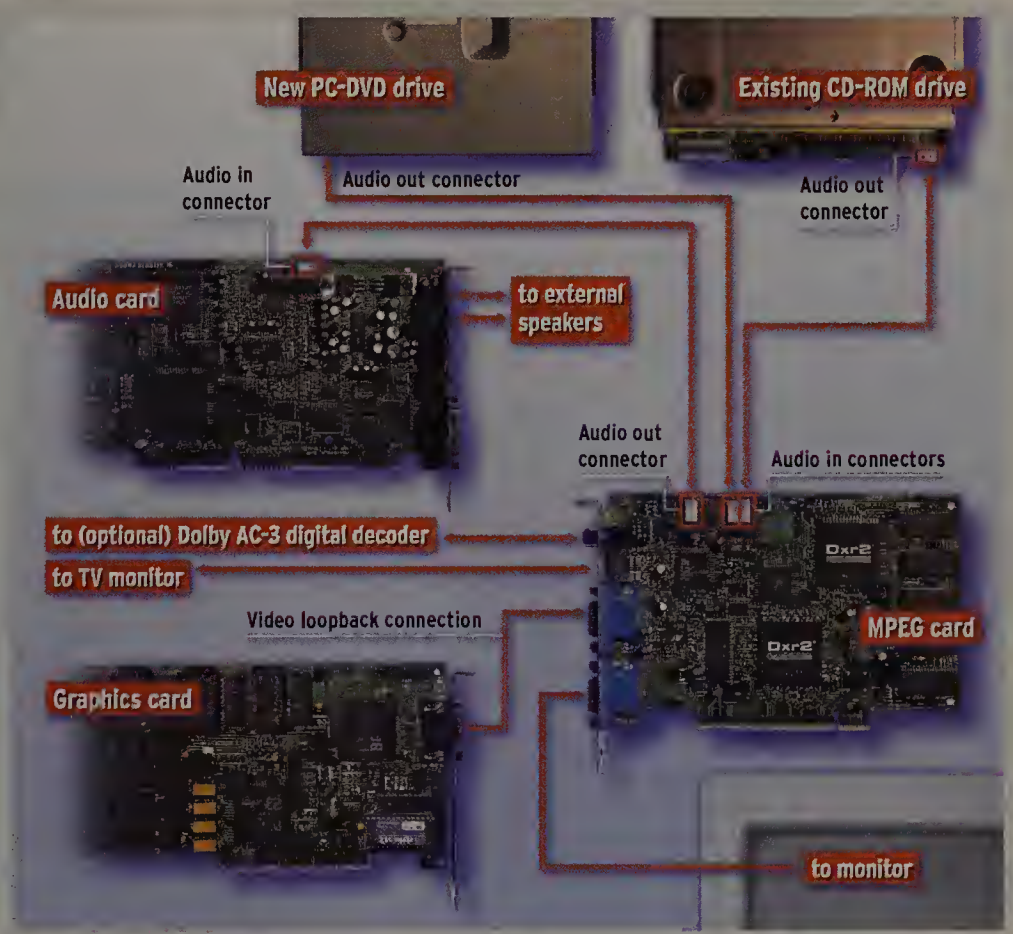
4 Hook up the sound and video cables. Read your DVD installation manual carefully, since there are various ways to cable together the DVD drive, MPEG card, existing sound card, and existing CD-ROM drive (if any).

Here is a typical approach:

Connect the internal audio cable from the rear of the DVD drive to the first audio-in connector on the MPEG card. If you find an internal audio cable from your existing CD-ROM drive fastened to your sound card, disconnect that cable from the sound card and plug it into the MPEG card's secondary audio-in connector.

Next, connect an audio cable from the audio-out connector on the MPEG card to the sound card's internal audio-in connector. Remove the monitor connector from your graphics card and plug it into the appropriate connector on the rear of your MPEG card. Find the VGA loopback cable included with your DVD kit. Attach one end of it to your graphics card and the other to the input connector on your MPEG card.

If you want to use a TV monitor with your DVD drive, link the video-out connector on your MPEG board to the monitor's video-in connector.



5 Install the drivers and DVD software. Still with us? Power up your PC. Windows 95 will detect the MPEG board and ask you for a driver. Insert the driver floppy that came with your DVD kit and click *OK*. You may need to restart your PC before proceeding.

After the driver is installed, insert the DVD player application CD-ROM that came with your kit into the DVD drive. Follow its directions to install the software for controlling DVD discs. During the installation, you'll need to specify a regional code; enter 1 for North America.

6 Tweak the settings and get DVDing. Put the cover back on your PC. Insert a DVD disc into your DVD drive. Follow the directions that come with the software; starting up a DVD movie usually involves clicking the player icon. You may need to configure the DVD video alignment for your graphics card and monitor, though most DVD player software does this automatically. Read the manual!

If you have problems, double-check that all cables—especially audio cables—are properly connected. And be sure to check Windows 95's volume control by choosing *Start•Programs•Accessories•Multimedia•Volume Control.*

If problems persist, check the data and power cables, and try reinstalling the driver. If that doesn't fix things, take a few deep breaths and call tech support.

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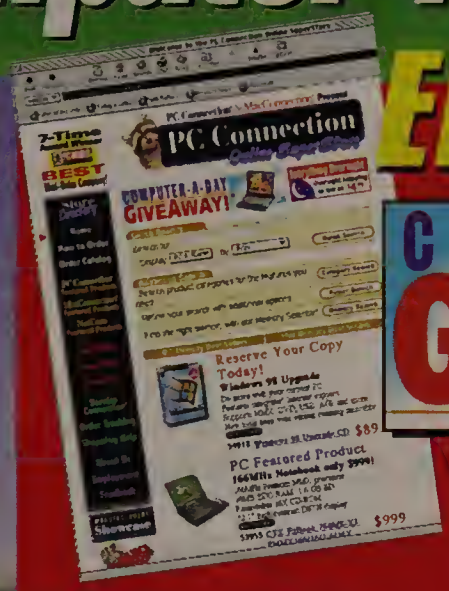

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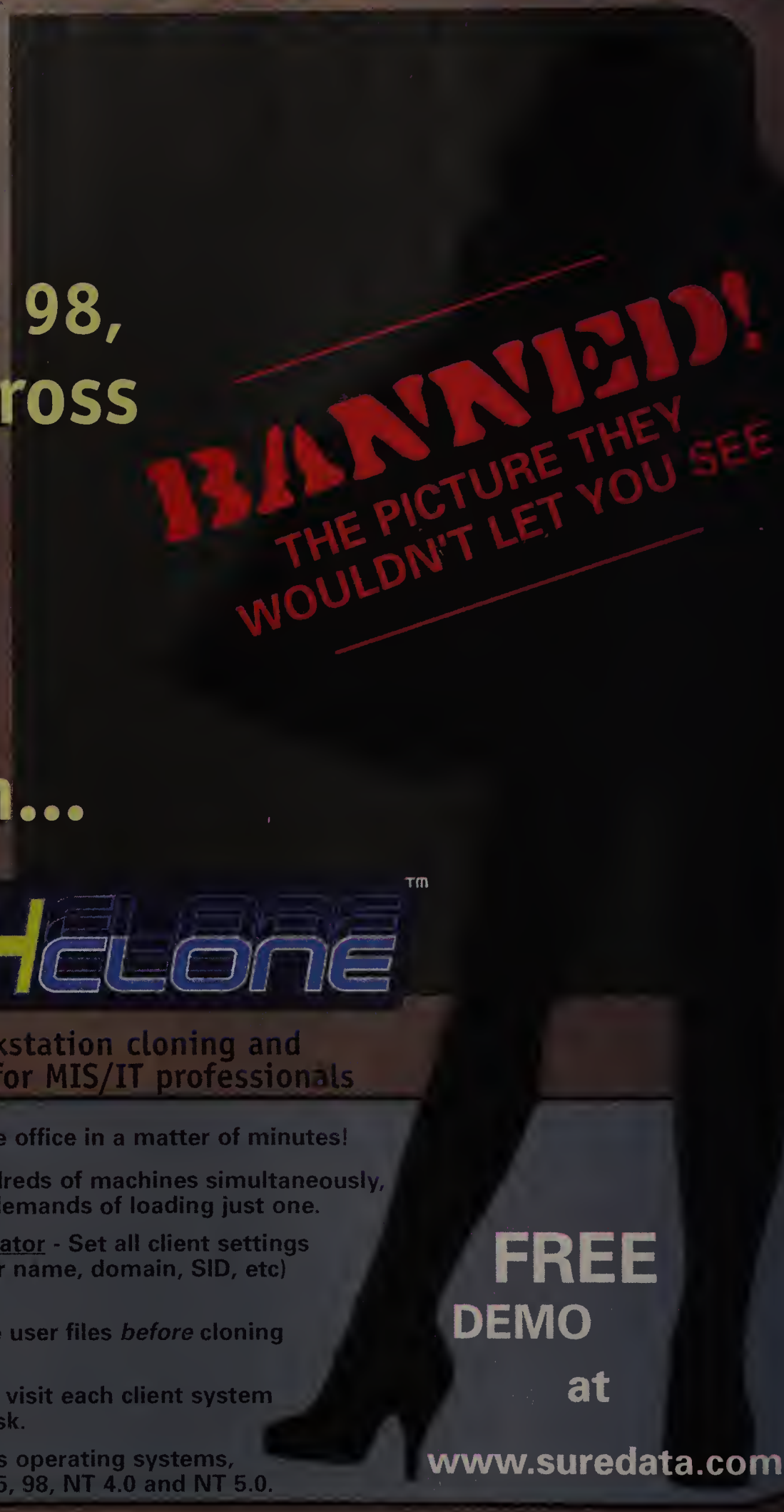

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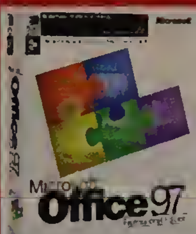

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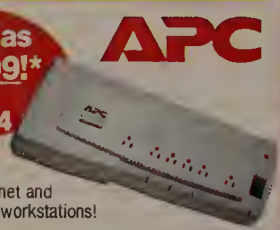

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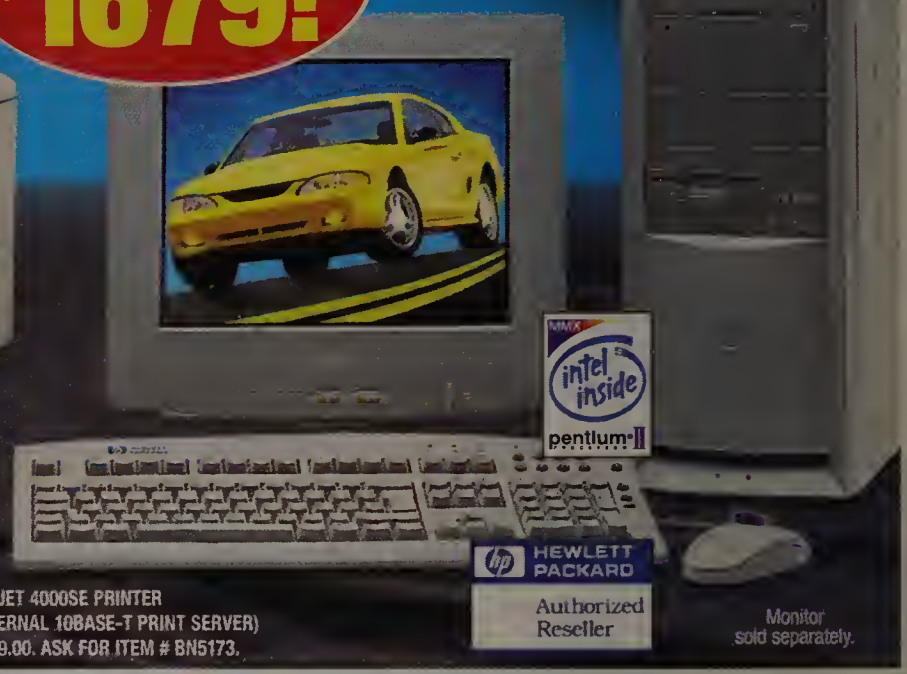

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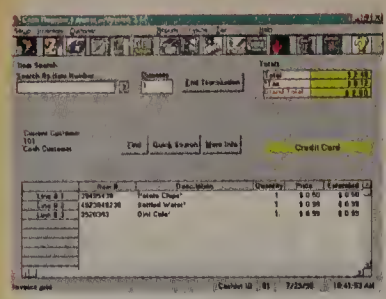

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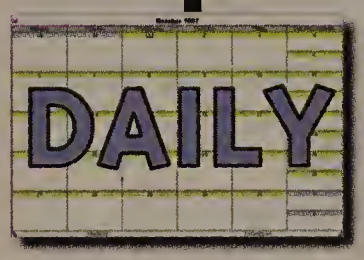

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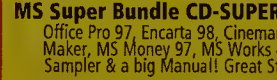

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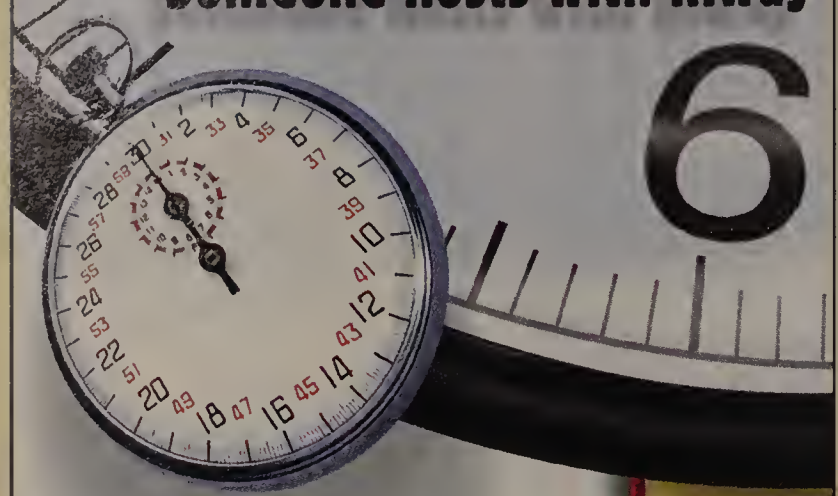

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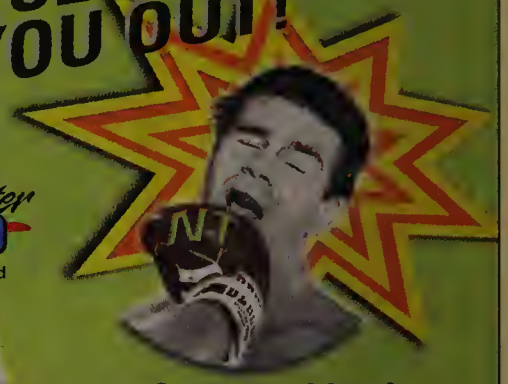

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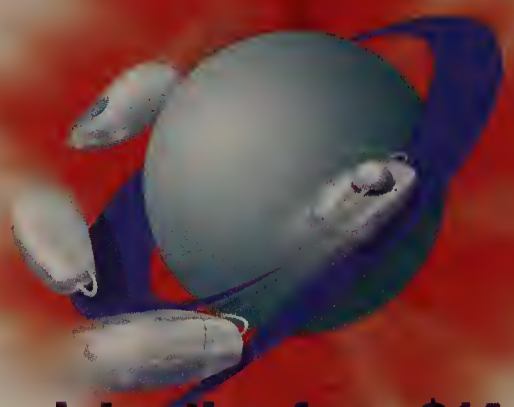

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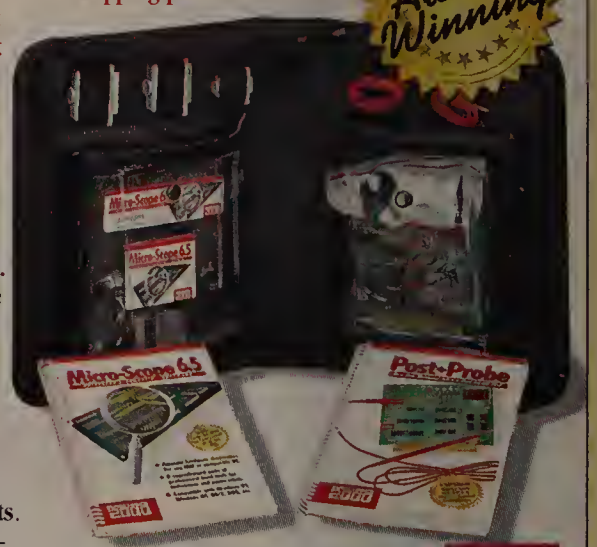

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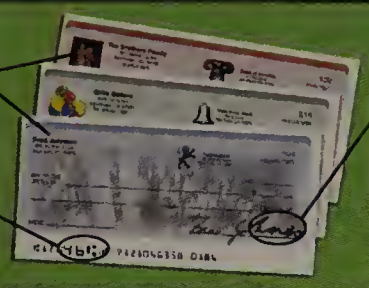

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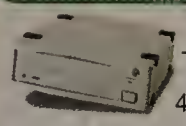

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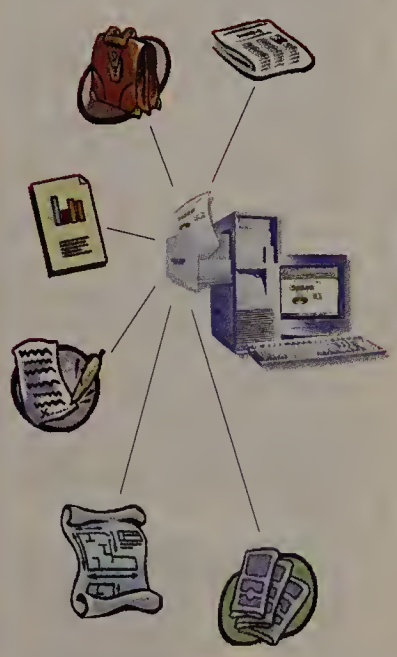

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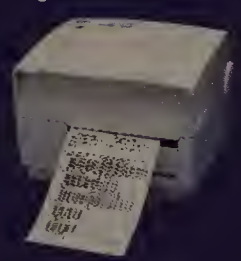

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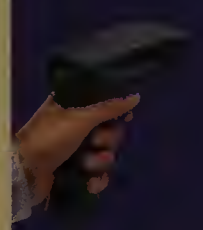

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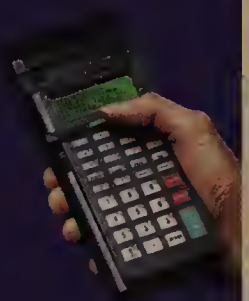

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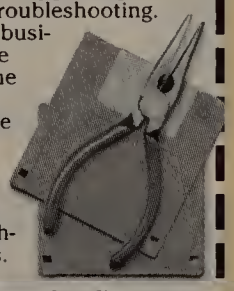

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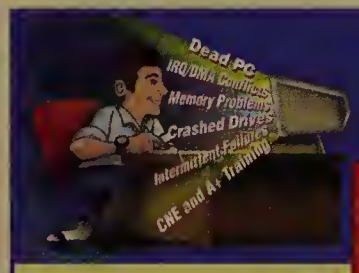

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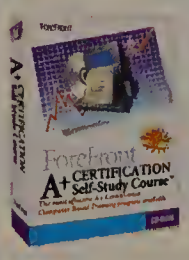

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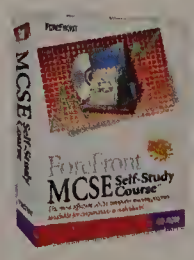

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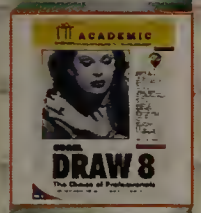
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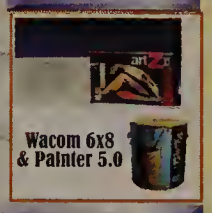
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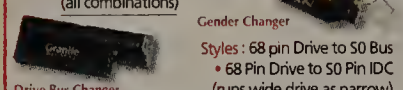

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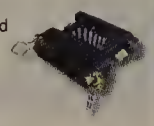

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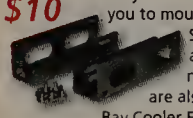

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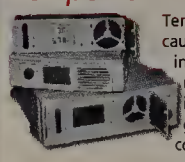

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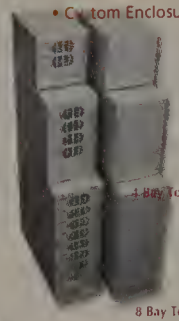

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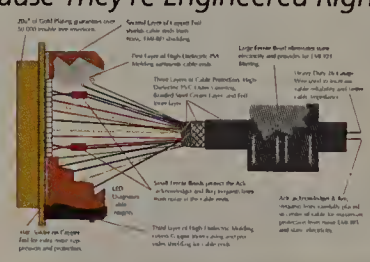
Granite Cables Are The Best Because They're Engineered Right.

Granite Cables were designed by SCSI Engineers to be the **Best Cables On The Market.** Everything about them means better performance and higher reliability. Our design incorporates an exclusive shield that protects the Acknowledge and Request lines from noise. Large Ferrite beads are installed on all cables to protect them from static and noise. Every cable incorporates a LED indicator that lets you know it is operating properly. We also use more **GOLD** on every cable. Add to this our impedance matching techniques and you have most of what makes us THE BEST!



NEW! ULTRA 2 SCSI 2X SPEED - 80 MB/s!!!

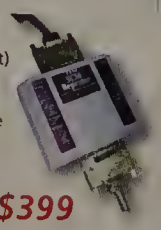
This is the fastest SCSI available! Twice as fast as Ultra 1 SCSI and without any of its limitations. If you want true horsepower this is the Ultra SCSI system to buy. Completely backwards compatible with Ultra 1 SCSI, Fast SCSI, and SCSI 1& 2!

The key to this new SCSI Standard is the use of Low Voltage Differential Technology. Also known as (LVD) and Ultra 2 SCSI, we can now achieve speeds that far exceed even the fastest computers data thruput capabilities.

Ultra 2 (LVD) - SCSI Repeater / Converter

Now you can take all your SCSI devices and run them any distance you want, (up to 75 feet) while sharing the Ultra 2 SCSI bus. This revolutionary Repeater / Converter will give you, not only long cable distance, but also complete compatibility with the new Ultra 2 standard. There is no need to have two SCSI Adapters taking up precious PCI slots. Two models are available, the internal model that mounts into your enclosure, Raid/Array case, and the external model that can be used anywhere.

$299



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Custom Teflon® Internal Cables

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Benefits:
- Less Errors, Ultimate Performance
- Silver Wire Improves Signal Quality

Features:
- Perfect 90 Ohm Impedance • Custom in 1 Day
- Triple Pronged Connector - Gold contacts Silver Wire

68 Pin Internal Cables, custom or stock, from 1 to 15 SCSI devices per cable. We can also make Custom 68 pin and 50 pin Combination Cables that allow you to use narrow drives on a wide cable.

Active Digital SCSI Repeater

From: $139

Benefits:
- Models for all SCSI types
- Fixes SCSI Cable Problems
- Doubles Cable Length (up to 18')

Features:
- Active Termination and Signal Purification
- Ultra Fast Performance for Added Capabilities
- Diagnostic Capabilities • 30u" Gold Contacts

OEM SCSI Repeater

If you integrate SCSI Raids or Arrays and are having problems making it work, the Granite SCSI Repeater will make it work. Designed to fit inside any computer or external case. These repeaters will double the cable length of any scsi bus allowing you to achieve the needed distance to make your system operate. Up to 3 repeater can be used.

SCSI Cable Tester - LED Readout

This Digital SCSI Cable Tester can test all the popular cable styles for opens, shorts, and unreliable operation. Battery powered for easy use anywhere you need it.

Three models to choose from:
- 50 pin IDC
- 50 pin Centronics
- 68 pin MicroD

From: $49

The Book of SCSI - An Adventure

Considered "The Bible" of SCSI Books, it includes chapters on SCSI basics thru Advanced SCSI. Written so that all of us can understand it, this is a reference guide that can be used by anyone. Its the best SCSI we have seen.

$34

SCSIPRO Utilities - SCSI Repair

A combination of SCSI Utilities that helps you manage and diagnose SCSI problems. Allows you to set the drive for AV or Data optimization. Does custom block by block copies. Allows you to monitor SCSI operations. For Windows 3xx, 95 and NT

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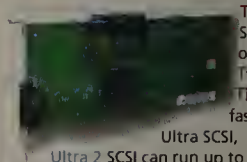
Ultra 2 (LVD) - SCSI Host Adapter



This is the fastest SCSI Host Adapter on the market. Two Times as fast as Ultra SCSI, Ultra 2 SCSI can run up to 80MB/s! This blistering fast speed is accomplished using (LVD) technology. This new technology also allows you to use all the existing peripherals that you currently own and share them with this Ultra Fast Bus.

From: $299

Cable length has also been a limitation with Ultra SCSI, but with Ultra 2 the cable length is no longer an issue. You can easily connect up to 15 devices on this bus and have room to spare. Also with the use of our Ultra 1 to Ultra 2 repeater/converter you can use all of your existing peripherals and your new LVD peripherals and get up to 4 times the original cable length.

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Advertised Products

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952	Notebook computers	956	Graphics software	960	Utilities
953	Windows 95 software	957	Network/sharing products	961	Mail order companies
954	Monitors and video boards	958	Printers	962	Storage devices

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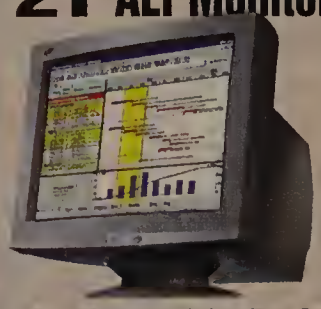

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Smart Mail, Stupid Software

IN MY YOUTH I HAD A SUMMER JOB with the Postal Service, but I never intended to make a career of it. Today I may not haul heavy sacks out of hot trucks, but I spend too many hours each day digging my way out from under stacks of e-mail. Managing mail is the kind of grunt work PCs are supposed to do for us, but I'm stuck with the job—largely because e-mail software offers less elegance, speed, and power than a postal truck.

For the moment, let's put aside e-mail's basic orneriness. As my favorite line from the Eudora Pro manual puts it, "The Return Receipt options may or may not work as described, depending on your recipients' e-mail software." That uncertainty extends also to the rest of the messaging world. Unless you know your recipient, there's still no telling what your mail will look like when it arrives at its destination—and don't get me started on file attachments.

Incompatibilities will disappear, but one question remains: Why is my **e-mail** client so utterly **brain-dead?**

THE EVER-GROWING IN-BOX

AS INTERNET STANDARDS develop, incompatibilities will gradually disappear. Still, one maddening question remains: Why is my e-mail client so utterly brain-dead? That collection of messages gathering in your in-box may be more valuable than you realize. But the software's limitations subtly encourage you to delete the mail—or leave it in one enormous, increasingly bloated in-box.

Personally, I'm a big fan of saving just about everything. Deleted mail always comes back to bite you when you least expect, and saving it can pay unexpected dividends. That exchange you had a couple of months ago with a long-lost business contact may have seemed irrelevant at the time, but it can be a lifesaver when you need to find her phone number in a hurry. It's gratifying to have proof that you really did accept that once-in-a-lifetime deal when the price later doubles. Besides, someday your e-mail database may kindle fond reminiscences of that winter you spent in accounting. Most programs offer sophisticated search tools that let you sniff out a single word in a year's worth of mail—a real improvement that makes retaining messages worthwhile.

But organizing your mail is still way too hard. Sure, you can set up filters to scan incoming messages and funnel them to waiting folders, but that practice seems to call for the kind of programming that isn't exactly second nature to average human beings. Besides, it requires you to wade through multiple folders just to check your mail. I want things to work the way postal mail does, with all the new stuff landing in a single in-box and getting sorted once I've glanced at it.

YOUR OWN PRIVATE MAIL CLERK

DESPITE YEARS OF "improvements," mail programs are still stone stupid. I shouldn't have to spend hours selecting mail and moving it from one folder to another; the program should do it for me automatically. The first time I read (or maybe just right-click) a piece of hate mail from John Q. Cranky, I may have to send it to the Cranky folder myself, but my e-mail client should route his next flame there without my doing a thing. The program should learn from my actions and store copies of my nastygrams to old Johnny in the same folder unless I tell it not to. Too bad no e-mail client I know of actually works this way.

Another problem with e-mail involves backup and storage. The in-box and other folders are essentially giant databases that never stop growing. So I back up the same burgeoning files—and the same messages—over and over, wasting time and space. I'd like to see a program automatically remove older messages from the database once a month and compress them into Zip files. You could still read, search, and sort the Zipped messages. But since the Zip files are unlikely to change, you'd have to back them up just once.

Would features like these shorten the time I spend managing my e-mail? You bet. And then I might stand a chance of getting some work done instead of acting as my own private mail clerk. If somebody doesn't develop a better e-mail client soon, I may just have to go postal.

PC World *Contributing Editor Stephen Manes is a columnist for the* New York Times *and is a cohost of* The Digital Duo, *a technology program on public television.* ■

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- Encarta 98 Encyclopedia
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- 64MB ECC SDRAM
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Common features listed above plus:

- 13.3" XGA Active Matrix TFT Display
- 64MB SDRAM Memory
- 4GB Ultra ATA Hard Drive
- Modular 24X Max^^ Variable CD-ROM Drive
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- 64MB SDRAM Memory
- 4GB Ultra ATA Hard Drive
- Modular 24X Max^^ Variable CD-ROM Drive
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★ *Upgrade to a NEW 6.4GB Ultra ATA Hard Drive, add $299.*

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- 32MB SDRAM Memory
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